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GEORGE BRONSON REA.

Editor and Publisher of the Far Eastern Review

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In this issue of the *Far Eastern Review*, the first of this series of articles appear:

"CHINA AND THE LEAGUE OF NATIONS."
"BRITAIN'S HONORABLE ALLY."
"JAPAN'S RIGHT TO EXIST."

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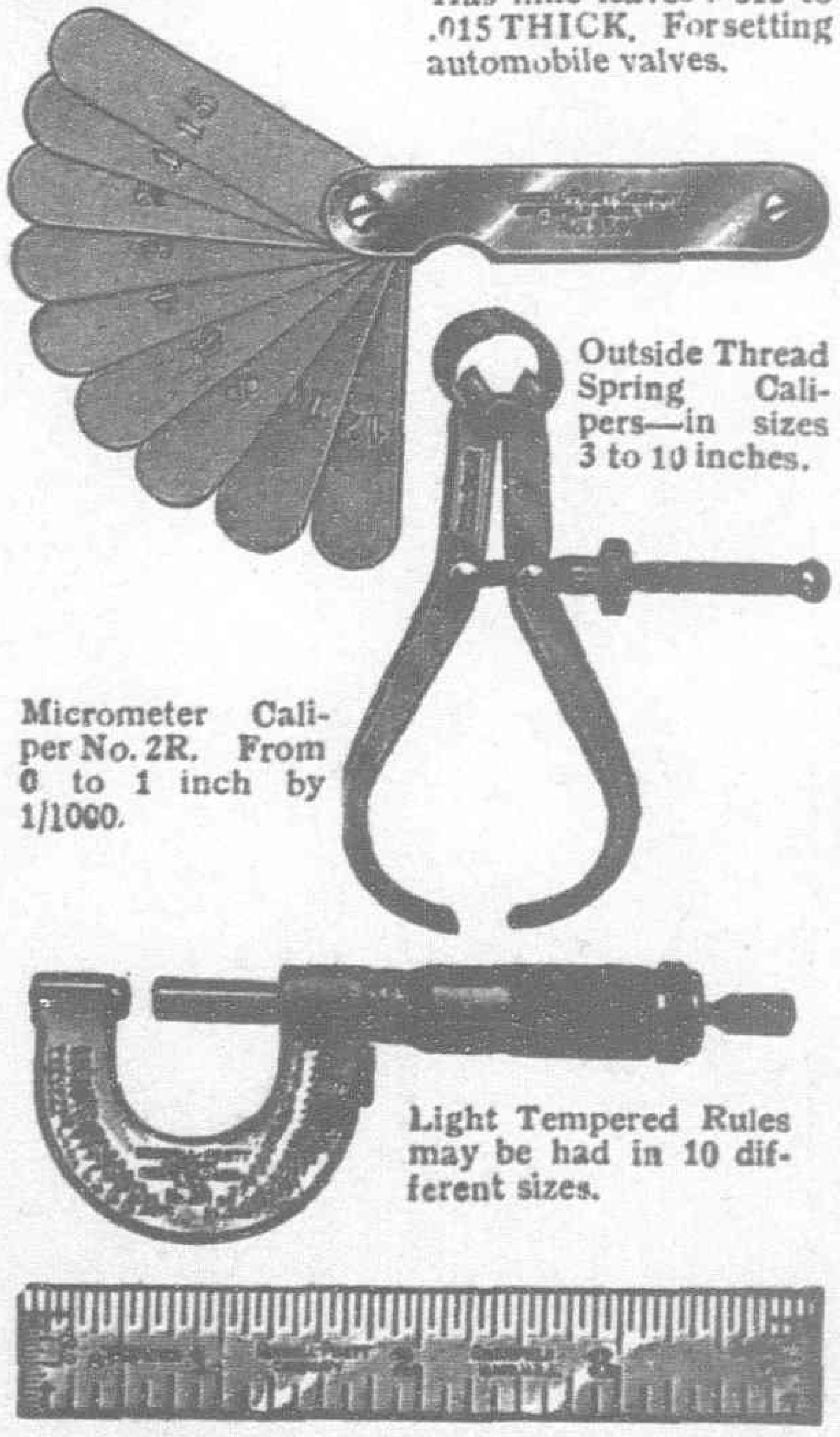

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The Far Eastern Review

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Japan's Right to Exist

Some Thoughts on the Chartered Bank Report

By George Bronson Rea

London, March 30.

FOR twenty-two years Sir Montagu Turner has directed the affairs of the Chartered Bank of India, Australia and China, during which time the dividend has been increased from ten to over twenty per cent., the shares have doubled in value and the reserves built up from £300,000 to £4,000,000. A splendid achievement. The bank has grown in prestige and usefulness branching out in its chosen field wherever the advancement of British trade required its services until now its forty-five branch offices are familiar landmarks in all the Asiatic trade centers from Tokyo to Bombay. The annual report to the shareholders is invariably an accurate, impartial and highly interesting summary of Asiatic political and trade conditions. The chairman has the happy faculty of illuminating a dry and uninteresting financial statement, with valuable remarks on the general Far Eastern situation. His last report for the year ending December 31, 1925 is a faithful though condensed summary of actual conditions, ending with the happy announcement that the bank will distribute a 14 per cent. dividend together with a bonus of 6s. 3d. per share free of income tax, representing a return of 20¼ per cent. One is prepared after reading the depressing introductory remarks to accept what follows as a justification for reducing the dividend and we can imagine the joy of the shareholders on learning that although nearly every British hong in China is fighting with its back to the wall in the fierce struggle to survive, the Chartered Bank is paying its customary fat dividend and piling up reserves. This feature of the report together with the trade returns lends strength to the Foreign Secretary's view that the position of trade and industry in China is not quite as disastrous as it is purported to be.

Japan's Competition

While it is not our purpose to take issue with Sir Montagu Turner or underestimate the value and importance of his excellent report, his remarks afford us an opportunity to invite attention to essential truths which may help to a better understanding of the forces underlying the present disastrous state of British trade in China. In explaining the reason for the decline in imports from Great Britain into China during the last year for which figures are available (1924), Sir Montagu says that there is more than one cause and " regrets to say that Japanese competition has cut very seriously into our trade, and it affords one food for thought to consider the merits or demerits of such matters as international eight-hour-day agreements when a vigorous competitor like Japan is not in the fold." In referring to Indian conditions he also "regrets to say that the Indian mills are still suffering badly from their exceedingly keen competition with Japan where the system of long working hours still prevails, a severe handicap to the Indian mills."

This simple statement of fact, however diplomatically put, leaves the impression that Japan is not playing the game. It is unfortunate that a leader of high British finance should feel impelled to emphasize the part played by Japanese competition in cutting into British trade in India and China as the unqualified statement is certain to be misinterpreted and employed as an additional argument in the insiduous anti-Japanese propaganda disseminated throughout the world from Europe, and stiffen British antagonism towards Japan in China.

The Japanese textile manufacturers might well reply that their ability to market their products is as much a life-or-death matter to the economic existence of Japan as it is to Lancashire, in fact, more so, for while the unemployed Briton has unequalled opportunities for finding relief by emigrating to the many fertile colonies ruled over by Great Britain, the exclusive laws of America and the British Dominions compel the Japanese to remain at home, where they must work or starve. The inference that Japan is not adhering to international standard of trade ethics is only the first rumble of the storm of angry denunciation that is bound to follow as the struggle for existence in Japan becomes intensified through being denied an outlet for her people, forcing them to work at reduced wages in order to live. There is a distinct parallel in the population problems of Japan and pre-war Germany, with the difference that where the doors of all countries were open to the German emigrant they are now closed to the Japanese. The Germans, however, refused to emigrate in large numbers, remaining at home to build up the most formidable and efficient industrial machine in the world, which, by reason of the keener struggle for existence confronting them, resulted in their capturing the markets of the world and seriously endangering the British trade position in their own colonies. One of the lessons taught by the Great War is that a rapidly multiplying people confined in a restricted area must be provided an outlet, or, by compelling them to remain at home, the rest of the world must face the alternative in disastrous trade competition. The penalty must be paid, either by handing over to them additional territory or inviting a ruinous trade rivalry arising from their greater necessity for gaining a livelihood. There is no escape from these alternatives.

Japan not to Blame

On the other hand, the efficiency of the Japanese mill-hand and workman is considerably lower than that of the British mechanic and even though paid an equal wage he would have to work longer hours to even up the difference. This is the almost unanimous verdict of every foreign engineering expert who has carefully investigated working conditions in Japan. There is no need to stress this point. Even the Japanese admit it. So the longer working hours prevailing in Japan cannot fairly be cited as a reason for the failure of British manufacturers to compete with the products of their labor. Might not the cause be found nearer at home ? The present tendency of British labor unions to limit production in order to make jobs last longer, has probably as much to do with the cost of their finished product and consequent decline of British trade as the longer working hours of the Japanese.

It is only necessary to read the current articles appearing in *The Daily Mail* setting forth the findings of the British Labor

Commission investigating American manufacturing methods, to realize that unless the British workman comes to his senses and gives a fair day's work in exchange for a fair day's wage, American and perhaps German efficiency will make still further inroads into his special markets and deprive him of the means of livelihood. It was only the other day that a statement was made by the head of the British Empire Steel Corporation (operating under government lease the iron deposits of Newfoundland), that its cost of production and delivery of iron ore was so affected by inefficient methods of cargo-handling in British ports that they could not rely on Great Britain as a market. "It takes," declared the chairman, "fourteen days to unload a cargo of iron ore in British ports against two days in Rotterdam where the ore is unloaded for the German market which takes eighty per cent. of its total output." The superior efficiency of the Americans and longer working hours of the Asiatic may serve as a satisfactory argument to sooth British sensibilities and blind them to their own mistakes, but in view of the voluminous testimoney concerning labor conditions and troubles in the British Isles they are not convincing to the intelligent foreign observer.

That everything is not as it should be in the British cotton industry is indicated by the present slump and movement now taking definite shape for some form of control in the spinning section. According to the head of one of the largest groups of British mills, the present disastrous situation is entirely due to the spinners themselves, who, as soon as short time movements had improved trade, began the process known as "inching in," that is underselling one another. This had brought the trade down to a lower point than before. The spinners were very happy under the Cotton Control Board during the war, and resolutions are now being passed by the shareholders of many companies urging that there should be a government inquiry into the state of the cotton trade on the lines of the commission on the coal industry.

In declining to sign the international eight-hour-day agreement it is quite evident that Japan had her own special reasons for doing so. The Japanese Government very probably and most properly declined to sign away the only small margin of advantage that enables its people to eke out an existence in competition with more efficient nations. The cost of living is exceedingly high in Japan; in fact, much higher than in England. Tokyo to-day is the most expensive place in the world. Japan also has her labor troubles. The Japanese mill-owner is not always in the same fortunate position in regard to his workmen as his British colleague who can shut down his plant and lay off men at will. When the Japanese manufacturer is compelled to discharge a large number of operatives in order to reduce expenses, he generally has to pay them a year or two years wages for the privilege of exercising this right. We do not recall at this time any incident during which this system has been invoked in the Japanese textile industry, but we have a vivid recollection of its application in the government and private dockyards and other manufacturing industries, which confirms our belief that the textile manufacturers are not exempt from the hold-up of labor. It behoves the Japanese manufacturer to keep his establishment working at full time and to set aside a tidy sum out of his profits against the day when a decline in business will restrict his output, or force him to close down, and discharge his men.

Portents to the Future

The internal pressure in Japan is yearly growing greater. An outlet must be found, as even by working day and night and creating new industries up to the limit of their financial resources, the capitalists of Japan can only partially relieve the situation. The Kanegafuchi Spinning Company, (the largest textile company in Japan) has recently contributed from its own funds the necessary expenses for a committee to proceed to the headwaters of the Amazon and make a report on a concession covering twelve million acres which the Brazilian Government has granted to the Japanese for settlement and exploitation. This is merely one of many sighs which convey to the observer that the internal pressure in Japan is rising to the danger point. Another portent is seen in the announcement that Baron Goto will emerge from his retirement to head a new political party whose main planks will be the solution of the population problem and safeguarding Japanese interests in Manchuria, at present Japan's only outlet. As Goto's political strength is derived from the radical and labor element, the next general election, (the first under the new suffrage law) may have some startling surprises in store for the rest of the world. Goto also advocates closer relations with Russia. The struggle for existence in Japan is plainly becoming keener and the Indian and British textile trade is feeling the first disastrous effects from an unavoidably merciless competition. If, instead of pointing to this competition as a reason why Lancashire is losing out in a life-or-death struggle, and so creating misunderstandings that will ultimately lead to hatred and strife, the British would sympathetically cooperate with their old ally to find a solution to her problems, the cause of humanity and economic stability would be immeasurably advanced.

Indian Mill Mismanagement

Our point of view is supported in part by the testimony of Sir Charles C. McLeod, chairman of the National Bank of India in his annual report to the shareholders. In explaining why the Japanese mills are underselling the Bombay mills in the Indian market, he makes no reference to the longer working hours in Japan but says; "not doubt a depreciated exchange has enabled the Japanese manufacturers to compete in India: but surely, with the raw material at their door and the whole of India as a market for their production, Bombay mills should be able to hold their own. During their period of prosperity some of them were too lavish in distribution of profits and sufficient financial provision was not made for the adverse times which come to most industries. With economical and intelligent management there is no reason why Bombay mills should not return to prosperity."

As the yen is rapidly recovering its par value, depriving the Japanese of the advantage of a depreciated exchange, this factor will soon disappear from the competition, and the slight advantage enjoyed by Japan by working longer hours should be more than offset by the price of raw material and unequalled facilities in marketing enjoyed by the Indian mills. If, however, instead of honestly admitting the facts and Japanese competition in the form of longer working hours is employed to divert attention from mismanagement in India and labor troubles in England, British sentiment is going to grow more and more hostile towards Japan.

An Unequal Doctrine

How Anglo-American Co-operation Works Out in Practice

The British Disaster in China—Its Underlying Causes

THAT part of Sir Montagu Turner's report touching on the disastrous consequences to British trade and shipping in China arising out of boycotts, strikes and general anti-British agitation, taken in conjunction with an article in *The Times* published the day previous describing conditions in Hongkong and giving figures approximating the actual value of the losses, conveys forcibly to the British people a better idea of what they are now up against in China. These figures reveal that the British losses are far greater than those inflicted in the original boycott supported by deluded Anglo-Americans in order to punish Japan for her political activities in China during the great war. In summing up the losses to Hongkong, *The Times* correspondent takes the average yearly trade turnover as £100,000,000, which at a profit estimated at from 5 to 10 per cent., would be £10,000,000 at the outside. Allowing for the decrease of trade in 1925 at half the average, he puts the loss for that year at £5,000,000 without calculating the cumulative loss through the failure of this sum to circulate. When to this is added, the losses to British shipping, failure to pay interest on loans, inability of Chinese merchants to settle their accounts, illegal taxation and other handicaps to profitable trading, the cumulative damage to British trade rises to still greater sums. The weapon weilded against Japan in 1920-21 has reacted with telling force against the national interests of those sentimentalists (who themselves had nothing to lose) who encouraged the Chinese to hurl the boomerang at Japan.

These misguided Anglo-Americans, were also prominent in the agitation for cancelling the Anglo-Japanese alliance, the root cause, so they declared, of all China's woes. Thanks to their propaganda and activities, combined with pressure from America and the Dominions, the alliance was scrapped, exposing British interests in Eastern Asia to the certainty of a Bolshevist onslaught at a time when the Imperial Government was beset at home and abroad with difficulties demanding its immediate attention. Britain's one safeguard against the come-back of Russia in the Far East was sacrificed on the altar of Anglo-American friendship, surrendered at the behest of enthusiasts who saw in such a move, the downfall of Japanese prestige in China. Japan was swept into the discard. She did not count in the new era that seemed to be opening up under the ægis of Anglo-American co-operation.

Now, four years later, it is Britain's turn to feel the weight of Chinese antagonism, and the British trader who had no part in the campaign which led to his ruin, turns instinctively to his government for comfort and relief, only to find that it is bound hand and foot by agreements and understandings with other powers who have no material interest in China. Sir Montagu remarks in his report :--

> "It is not surprising that the sufferers by this unmerited adversity are inclined to think that the apparently supine conduct of the British authorities has encouraged the Cantonese strikers to persist in their outrageous conduct. At the same time, it must be remembered that Great Britain has not a free and untrammelled hand. It is almost impossible for her to act on her own in the matter of a display of force or by threats, and, unless the combined foreign nations bring pressure to bear on the authorities responsible for civil government in Canton, it would, I believe, be hopeless to attempt single-handed action on the part of Great Britain. But the position is most serious, and it behoves the British Government to lose no opportunity of coming to the help of the British merchants and effecting by some means a very necessary improvement in the condition of affairs in South China. That the Bolshevist influence is at work both in North and South China is undoubted. In the South, especially, money has been freely supplied by the Bolshevists, and this apparently has been found by utilizing the proceeds of Russian goods sold in China."

Reason for Soviet Success

Again, the report adheres to the simple fact without attempting to go behind it. The British, however, may well ponder over it and ask themselves how it is that the Bolshevists have been so successful, in China ; why have they been able to dominate Canton ? If they will recall the events of the past few years and be honest with themselves they will be forced to admit that their own mistakes in China are largely responsible for the disaster that has now fallen upon them. They listened to the call of America, to the cry for white union against the yellow menace in the Pacific, they were overcome with sympathy for China, gave way to the pressure of the Dominions and surrendered an alliance which had effectively safeguarded their position in the Far East for twenty years in exchange for an understanding which guaranteed the Pacific possessions of its signatories against attack for a period of ten years. Peace in the Pacific was purchased at the cost of British interests in China. Great Britain joined with America in stripping Japan of the advantages she had won during the great war, in demanding cancellation of the Sino-Japanese military pact for the defense of Mongolia, insisting upon withdrawal of her armies from Siberia and Northern Manchuria, surrender of Shantung and all strategical positions on the mainland (outside of South Manchuria) that would have enabled Japan to confine the Bolshevists to the territory west of Baikal. In the the consortium proceedings, Great Britain joined with America to compel Japan to accept the doctrine that Mongolia and Manchuria were integral parts of the Chinese Republic and exerted her diplomacy to deprive Japan of the right to build the Taonan-Jehol railway, which Viscount Chinda, then Japanese Ambassador at London impressed upon the British Government was the one defence of Japan and China against " the menace from the direction of Urga." Anglo-American post-war diplomacy laid down the rules of the game with no reference to the vital interests of Japan who, deferring to superior force, silently acquiesced and surrendered the right to defend herself, abandoning her strategic positions and leaving the door wide open for the Bolshevists to have their own way in Asia. Anglo-American diplomacy was so fearful that Japan might create for herself a sphere of influence in Mongolia and violate the doctrine of China's sovereignty and gain some advantage over them in trade, that they could not vizualize the obvious consequences. What they denied to Japan, Russia has since boldly annexed and is now using Urga as a supply base for the army of Feng Yu-hsiang to bring China into the network of Soviet republics. The warning of Viscount Chinda has come true. Impotent for the present before Japan's determination to defend at all hazards her position in South Manchuria, " the menace from the direction of Urga " is now directed through Kalgan towards the possession of Peking and the destruction of British interests and prestige in China. And although Feng may be defeated in the recent trial of strength, his army will retire into the vast empty spaces of Mongolia to await remobilization at such future time that he emerges from his period of training at Moscow and his Soviet masters are ready to have another try for the prize that is now slipping from their grasp. Feng will come back stronger than ever. There is a feeling in England that Japan is not playing the game because she refuses to come to its help at this juncture. The British have short memories—Japan remembers.

The Truth About Canton

It is easy enough to describe what is now happening in Canton but the British public will never be told by British journalists of the true causes which lie at the root of Canton's hostility towards Hongkong. To do so would be to admit their own infallibility and disinclination to work in harmony with British leaders of finance in China for the furtherance of national interests. The roots of Canton's intense anti-British hostility are firmly embedded in a deep hatred engendered as the result of a ten year bitter and vituperative propaganda against Dr. Sun Yat-sen indulged in by British journalists in China.

Two years ago, the writer was a guest of the late Mr. Alexander Stephen (head of the Hongkong and Shanghai Banking Corporation) at the Bank House in Hongkong and listened with intense interest to his plans for conciliating and co-operating with Canton. He told how he had called on Dr. Sun Yat-sen in Shanghai and overcome the latter's anti-British prejudices arising from British initiative in negotiating the Reorganization Loan which enabled Yuan Shi-kai to destroy the republic and elevate himself to the dictatorship. Mr. Stephen admitted that the loan was a political mistake, with the result that Dr. Sun promised to let bygones be bygones and contribute all his influence towards a better understanding between Canton and Hongkong. With this vision before him, Dr. Sun shortly afterwards made his reappearance in Canton stopping at Hongkong *en route*, where he was received by the governor and the leading merchants. As a result of this stop-over, he was able to raise a loan of $3,000,000 from a group of Chinese banks in Hongkong without opposition from the authorities or protests from the British community.

The following day in a talk with Dr. Sun Yat-sen at Canton, he corroborated all that Mr. Stephen had said and admitted that he hoped to receive adequate financial assistance as required from a group of Chinese banks in Hongkong. However, he expressed himself as being somewhat pessimistic about the new understanding, realizing that its success depended very largely on his own administration and ability to maintain himself in power, a difficult task because of the northern militaristic policy of uniting China by the sword. This, he said, would force him against his wishes to maintain a large army to defend Canton against attack by the forces of Wu Pei-fu and his southern henchmen and eat up the revenues intended for public improvements and financial rehabilitation. While convinced of the sincerity of Hongkong, he complained bitterly of the hostile attitude of British newspapers in Shanghai and North China which openly supported Wu Pei-fu's ruthless program of unification. He seemed to think that the real leaders of British interests in China domiciled in Hongkong, could not control their countrymen in the north, seeing in this conflict of views an obstacle to his own success. In the event that the British in North China persisted in supporting Wu and encouaging Chen Chiung-ming making his position in Canton untenable, he said, he would retaliate. Dr. Sun always insisted that his real power was derived from the masses; that the working classes in all parts of China were behind him.

In effect, the pressure of Wu and Chen ultimately forced Dr. Sun to concentrate on military affairs and brought about his inevitable collapse. He could not rely on Chinese banks in Hongkong to finance his campaigns, so had recourse to desperate and unpopular measures to raise the wind, which lost for him much of the sympathy of the Cantonese. British opinion in North China loudly applauded his downfall and when he embarked on a steamer to seek refuge once more in the international settlement of Shanghai, the British newspapers at that port started a movement to prohibit him from landing there. Dr. Sun was down and out when he left Canton, a drowning man, but the British newspapers in their haste to shove him under, extended a plank upon which he crawled back to dry-land. They provided him with a platform for the cancellation of unequal treaties, abolition of foreign concessions and other impairments of China's sovereign rights which united the country behind him. He proceeded to Peking and allied himself with the Soviet but died before he could put his plans into operation. Dr. Sun left a legacy of hate for his faithful followers to carry forward. Hongkong and British interests in China have paid the penalty. The responsibility rests not on the Bolshevists, who could have made no headway in China on the merits of their doctrines, but on the group of British journalists who hounded Sun Yat-sen to his death and even now while he lies in the grave are still villifying his memory. The lesson that lies in this story is that British interests as a whole in China will never be advanced as long as their leading correspondents in China are compromised to support the Peking Government. British interests in China may possibly be furthered by a strong government at Peking headed by Wu Pei-fu, but Peking is not Canton and Peking can never coerce Canton. The moral is that British leadership in China which led them to victory in the old days has been surrendered to a group whose first allegiance is to the Peking Government. Until Hongkong snaps out of it and exerts its authority, the colony will continue to pay the price.

Britain Helpless

On the same day that Sir Montagu's report was given publicity, Mr. Looker, in the House of Commons, urged the British Government to consult with the other powers interested with a view towards taking joint action in China. For about the twenty-fifth time in recent months, the Foreign Secretary reiterated the firm stand of the British Government in the following words :—

"The instructions sent to His Majesty's Minister at Peking were that armed forces should only be used in the last resort for safeguarding the security of foreigners. He was aware of the grave situation in China. There were, however, certain elements in the position as, for instance, last year's record returns of trade published by the Chinese Maritime Customs, which showed that the position of trade and industry in China was not quite as disastrous as indicated by Mr. Looker. Joint action by the powers to stop the civil war would involve a reversal of their agreed policy of non-intervention in China's domestic affairs, and would entail the use of armed force. It was not the intention of His Majesty's Government to advocate any such proposal."

In other words, Great Britain has surrendered her right to individual action in China, to the point where she must now stand aside and watch her vast interests in that country being destroyed without lifting a hand to save them. Anglo-American co-operation which was expected to accomplish great things towards progress and development in China has simmered down to the subordination of British policy to the educational and missionary interests of America, with the possible sacrifice of trading rights to the higher principles involved in the surrender of extra-territoriality and those other safeguards to foreign residents now deemed superfluous for the protection of the missionary.

American Leadership

Great Britain with her important interests and investments in China has handed over the leadership to America, whose chief concern in that country is to maintain it open as a field for the distribution of its charities. While Britain and Japan are annually losing enormous sums in China, America proceeds cheerfully ahead contributing about $15,000,000 gold a year for educational and missionary purposes in that country and to maintain an army of uplifters who outnumber and outvote the trading communities two to one. Under these conditions, American leadership in China means the eventual surrender of British commercial interests to emotional hysteria.

While British trade with China is paralyzed and her losses are steadily mounting, British opinion at home is beginning to question the wisdom of having thrown Japan overboard at Washington. They miss the friendship and loyal co-operation which for twenty years acted as a protection to their position in the Far East. But the Anglo-Japanese alliance is gone. It cannot be revived. Twice during the Great War the powers requested Japan to send troops to China to preserve foreign lives and properties in China, and then turned on her immediately they had no further use for her. Japan will never act again as Europe's policeman in China. She is now China's friend and ally. So Britain stands alone and feels lonely, facing the bankruptcy of her firms in China and increased unemployment at home as a result, while relying on American co-operation to pull her out of the hole.

Britain has already learned that Americans are undependable in international emergencies. We look at things from a different standpoint. Our views rarely harmonize. The British are essentially world merchants and traders. The Americans are idealists, uplifters and philanthropists. We have the money and the resources. Our mission is to reform the world and make it safe for democracy. Under American leadership in China, we can be depended upon calmly to watch the gradual disintegration and destruction of British and Japanese industrial enterprises and investments without lifting a hand to save them. We have no real stake in a country where our main concern is to distribute charity. We care more for the up-lift and good-will of the Chinese, whom we have set out to convert to christianity and democracy, than we do for our blood-kindred whose millions are out of work and are kept alive by a miserable unemployment dole.

Britain—The Goat

No matter how fervently and sincerely the American and British element in China may plead for co-operation in restoring stability to that country, the British at home are about fed-up with a unilateral doctrine from which they derive no benefit. China's resentment against the operation of the so-called "unequal treaties" is mild compared with the British reaction to lost-war hysteria when it was fondly dreamed that Anglo-American unity would solve the problems of the world. There is a deep undercurrent of discontent in finding their hands tied as a result of their former leadership in Chinese finances passing to the American group in the consortium.

The British now see their government carrying the load in the League of Nations which the American senate refused to join after its President had induced the other powers to accept it as a cure-all for world ills. They have had the mortification of seeing their Locarno dream for European peace shattered by the single veto of a South American state, having no direct interest in European affairs, a state which by reason of its coming within the scope of the Monrce Doctrine, is outside the reach of the League should it ever become necessary to take it to task. Like Finnegan, America is in the League when it suits her purposes and out of it when her assistance is required for any task that might involve inconvenience. The United States refuses to co-operate with Europe in Europe; her Monroe Doctrine preserves Latin-America from European interference, but she welcomes European co-operation in the Far East. In fact, single-handed, America will take no intiative in the Far East nor will she permit any other power to take the lead, insisting at all times on international unity. America is strong for international co-operation in a part of the world where her philanthropic policies are certain eventually to destroy the financial and industrial investments of her associates. Yet she rejects the principle of co-operation in all other parts of the world, a one-sided and supremely selfish attitude that is getting on the nerves of Europe in general and the British in particular who have awakened tardily to the fact that they have been decorated with the Grand Order of the American Goat.

America's Shroff in Europe

America holds Great Britain to her war pledges and insists that she shall stand guarantor for the debts of several of her late allies. Great Britain acknowledges the justice of these claim and is doing her best to make good. She is now paying the United States about £33,000,000 annually and hopes eventually to collect from France some £12,500,000 ; from Germany £15,000,000 ; from Italy £4,000,000 and a further £2,000,000 from other states. She will then have to dig down in her own pocket for another £6,000,000 to meet the deficiency when the total annual remittances to America will reach £38,000,000, over £100,000 a day. These payments are certain, while Great Britain's ability to collect from the others are contingent on future debt settlements which for the present seem to be hopeless.

The situation was summed up last week in a remarkable speech made by Mr. Churchill in Parliament. He pointed out that when all the debts had been funded, the United States would be receiving in one way or another at least 60 per cent. of the total German reparations. "An extraordinary situation," he said, "would be developed, that—the pressure of debt extraction would draw reparations from the devastated and war-stricken countries of Europe, and that they would pass in an unbroken stream across the Atlantic to that wealthy and prosperous Republic. These facts, he concluded, would not pass out of the minds of any responsible persons, either in the United States or in Europe." America will receive the money through the efforts of Great Britain, which will incur all the odium and run all the risks, converting herself into America's bailiff and shroff in Europe. This aspect of Anglo-American co-operation at a time when American leadership in China is contributing to make Britain's financial load harder to bear, is having its effect. With the American income tax for the fiscal year showing a possible surplus of £35,000,0000 (equal to the sum paid to America by Great Britain) over the budget estimate and Congress preparing for a joy-ride on the wave of extraordinary prosperity, the governments of Europe are hard put to it to find revenues to meet their deficits. England is reduced to such extremities that it is now proposed to levy a tax on betting, estimated to bring in a possible £5,000,000 a year, while cabinets in France are created and overthrown from day to day because of the necessity of devising new taxation without touching incomes. The British are beginning to lay greater stress on the almost forgotten fact that there are eight sovereign southern states of the American federation who have defaulted on their loans contracted in Great Britain after the American civil war for the purpose of developing banks and railroads. These states, Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, and North and South Carolina, owe British investors a sum of money, which if calculated with five per cent. compound interest to date, would exceed the present British war indebtedness to the United States. It is urged that the excuses advanced by the defaulting states to escape payment of their obligations would not hold in any court of law, but under the eleventh amendment to the constitution of the United States, the bond-holders are precluded from bringing the defaulting states into court. The idea is gaining ground in England, that if the American government would accept its moral obligation by standing guarantor for these defaulting states, or at least take over the claims in order that proper legal pressure may be applied for their repayment, in the same spirit Great Britain is showing in accepting responsibility for the collection of American war debts in Europe, the doctrine of Anglo-American co-operation would be less one-sided.

It is interesting to note that the reasons put forward by these defaulting states are almost identical with those advanced by the group of Anglo-American sinophiles in Peking in order to justify China's repudiation of the Japanese Nishihara loans, to wit ; that the borrowed money was placed in investments which proved unremunerative ; that it was misappropriated by one of the State's officials or that the loans were contracted under an administration imposed upon them by the northern States.

In every way the British are beginning to realize that in playing the game with America they have got hold of the wrong end of the stick. Under these conditions, the picture of Anglo-American co-operation as painted by the little group of enthusiasts in China, fails to bring a thrill to the British public at home who have the other side of the canvas before them.

This sentiment is expressed in a leading article appearing in *The Times* of April 10, which concludes with the following paragraph :

> **"We as a nation are very deeply interested in the fate of China. Much, no doubt, has to be simply borne and endured while the slow days of trial pass, but an uneasy feeling remains that British policy should be far more active and that British initiative should be far more conspicuous than it is in China, for China and for the sake of those British interests which, having contributed so greatly to Chinese development, are seriously threatened in its present critical phase."**

We, who live in the Far East, may well ponder over these things and ask ourselves ; who started all this tommyrot about Anglo-American co-operation in China anyhow ? Who led the British into the position where they now find themselves trailing along with the international crowd behind a leadership whose sole aim is the uplifting of the Chinese at the expense of those whose loans and investments have made her what she is to-day ?

A War Debt Solution

America and Japan Please Note

REVIEWING in my last correspondence two recent anti-Japanese books written by prominent British authors, I emphasized the part that such propaganda is taking in the hope of bringing about hostilities between America and Japan. From a fairly intimate knowledge of the inside working of the previous campaign to railroad the two countries into war which was frustrated by the Washington Conference, it was easy enough to understand the motives for such an otherwise inexplicable movement. America and Japan were the only two nations which came out of the great war with profit. If they could have been influenced to settle their differences in the Pacific until Japan was vanquished, their huge, and to the European mind, ill-gotten war gains would have returned to the nations whose dire necessities made them possible. Incidentally, the American flag would disappear from the Pacific and Japan would be crippled and set back for a generation leaving the trade and development of China to be enjoyed by Europe. The same idea still holds good on the Continent where the belief that Japan and America must eventually fight is deep-rooted. Even at this late date, such a catastrophe would automatically settle the war debt controversy and call for a new shuffle in the payment of reparations which would reduce to a trickle the steady stream of gold now flowing from Europe to America, an impossible situation that must drain the wealth from an impoverished and war stricken continent.

The most illuminating and forceful comment on the Inter-Allied Debts in the British press following Mr. Churchill's remarkable speech on that subject, appeared in *The Sunday Times* of March 28, under the pen name of "Scrutator." After reviewing the facts and figures from all their angles the writer suggests how relief may come. "It may be," he said, "that America will grow to dislike her position of money lending creditor to Europe and will find her interests better served by hastening the recovery of Europe. There may be even a moral reaction against the unpopularity and inconvenience of being a dunning creditor. But what is certain is that any such change will be hastened in proportion as we become the spokesman for Europe in the matter of war debts." After moralizing on

nagging Europe to pay up, he says, "Possibly the solution may come by political means. America has very strong interests in the Far East, and it is possible that Europe may some day do her a turn there which will lead to a revision of the debt settlements."...........Our best plan would seem to be to form European opinion by leading it; and if we are America's bailiff in Europe, let us say as little as we can about it, and if possible, conceal the fact."

There is only one meaning to this solution. To any one who has kept in close touch with Far Eastern post-war politics and remembers the arguments advanced in the House of Commons in favor of establishing the Singapore base, the meaning is only too clear. It stands to reason that in the event America is involved in the Far East, the financial or moral support of Europe will cut very little ice one way or the other. In the event of war with Japan it is accepted in naval circles that the inferior American fleet will be driven out of Manila and Guam in the early stages of the conflict, thus handing over to Japan the supremacy of the Western Pacific until such time as the American fleet can find a new base of operations which will enable it to hazard a battle with some chances of victory. This would drag out the war for months or even years. In his history of this imaginary struggle, Mr. Hector C. Byewater, the British naval authority, leads the American fleet all over the Pacific seeking a suitable base which it finally captures at Truk. Yet Singapore, the existence of which was not even referred to in his book, and even delected from his map of the Pacific, was right there for the very contingency he carefully side-stepped. Mr. Byewater and "Scrutator" are evidently of the same mind in concealing as much as possible the British intention to lead European opinion, which by reason of the gullibility of Americans and tendency to have their international thoughts shaped by Europe, will maintain us in profound ignorance of what we are up against. "Scrutator" says in effect, "let us wait until such time as America and Japan come to grips in the Pacific, and the Philippines are in the hands of Japan, then we can invite their homeless fleet to make use of our impregnable little harbor of Singapore, which will shorten the war, and earn their undying gratitude. We can then make our own terms for the revision of the old war debt. In the meantime, let us form and lead European opinion and say as little about it as possible."

Forewarned is forearmed. Americans and Japanese owe a debt of gratitude to "Scrutator" for putting in black and white what they have long only suspected. Americans may not be able to counteract this insiduous propaganda as they still swallow lock, stock and barrel, all the sensational anti-Japanese yarns invented in Europe for their special edification. The only hope of combating such a campaign lies in closer trade and financial co-operation between Japan and America, a task for business men rather than the diplomats. Both American and Japan leaders are sensible of the drift of this propaganda and are doing their utmost to avoid the consequences. On the whole, we cannot blame the British for seeing in our necessities at a given moment, the chance to even up the score. In similar circumstances the American mind would probably react in exactly the same manner.

However, there are other ways that relief may come to Great Britain without looking forward to the time when "Europe" may be able to do America a good turn in the Far East. We will have more to say on this subject in future correspondence.

GEO. BRONSON REA.

Britain's Honorable Ally

Grey of Falloden on Japan's Loyalty

THE flood of memoirs and autobiographies of the great and near-great who played their parts in the mighty drama that terminated at Versailles, has impelled Viscount Grey of Falloden to contribute his knowledge, "not to reconstruct the past, to set his own part in affairs in a pleasing light, to vindicate or condemn any nation, but to present facts in such a way as to discover and help others to discover and draw, conclusions that may avoid another war of the same scope and character. Not until a new generation rules will books about the war be read, not to be refuted or acclaimed, but to be understood and there are many even of the war generation who are dispassionately and increasingly anxious to discover the truth." It is mainly for these, who have paid the price, and for those who will follow and judge more calmly, that Grey of Falloden, has emerged from his seclusion in order to lay bare in modest and convincing words, the part he played in fulfilling the trust imposed upon him as head of the British Foreign Office.

Speaking of the armament race before the war, Viscount Grey says that each government while resenting any suggesting that its own measures are anything more than precaution for defence, regards similar measures of another government as preparation to attack. The moral, he says, is obvious; great armaments lead inevitably to war. If there are armaments on one side, there must be armaments on other sides. While one nation arms, other nations cannot tempt it to aggression by remaining defenseless. Each measure taken by one nation is noted and leads to counter measures by others. While he is certain that the military power in Germany chose the time and precipitated the war, it is not in his opinion the real and final account of the origin of the Great War. The enormous growth of armaments in Europe, the sense of insecurity and fear caused by them—it was these that made war inevitable. This, he says, is the truest reading of history, and the lesson the present should be learning from the past in the interest of future peace, the warning to be handed on to those who come after us.

All through his narrative, Viscount Grey emphasizes this fundamental truth as the real underlying cause of the great war and pleads for disarmament and better understandings between the nations as the one safe road towards permanent peace. The book clears up many misconceptions about British motives and policies, giving a new insight into the workings of the British official mind towards international affairs. Its greatest interest to Far Eastern readers lays in the author's eloquent tribute to Japan's loyalty during the war. Coming from such a source the testimony stands as smashing indictment against those agitators who in order to sway British opinion in favor of China built up their arguments on Japan's alleged disloyalty to Great Britain during the Great War. Grey of Falloden, tells his story is a few straightforward words:

"In the early days the Japanese Alliance was a matter of some embarassment and even of anxiety. Japan was ready to take her part in the war as our Ally; the Far East and the whole of the Pacific Ocean lay open to her and were her natural sphere of operations. But the prospect of unlimited Japanese action was repugnant to Australia and New Zealand. They already regarded Germany, her position and transactions in the Pacific with misgiving; they would have viewed the substitution of Japan for Germany with positive alarm. Equally important, the effect of Japanese action on public opinion in the United States might be disastrous; it might even make American sentiment definitely antagonistic to us. It was unthinkable that we should not have the most scrupulous care for the interest and the feelings of the British Dominions that were taking their part in the war, ready to face danger and to make sacrifices with so much patriotism. We dared not risk offending the United States. We had, therefore, to explain to Japan that her help would be welcome, but that her action must be limited and her prospective acquisition of German territory must not extend beyond certain bounds. To explain to an Ally that her help would be welcome, but that you hope it will not be made inconvenient, is a proceeding that is neither agreeable nor gracious. It was however, not only politic, but essential for us and for the Allies."

"The Anglo-Japanese Alliance is ended; it has been superseded by the Washington Agreement, to which the United States as well as we are a party with Japan; but for all the eleven years when I was Secretary of State at the Foreign Office Japan was our Ally. In all that period the obligations that the Alliance might, entail upon us, the advantages that Japan might claim from it were never unfairly exploited by her. We found in the Japanese Government and its Ambassadors honorable and loyal Allies. They understood, as in the case of the Bryan Peace Treaty with the United States, the difficulty in which we sometimes found ourselves, and they smoothed the path."

"In the Great War they took some advantage of the opportunity to strengthen their position with China in East Asia. Europe was prostrated with war, the attention and at last the energy of the United States were absorbed in it. The opportunity for Japan was immense and unique. What Western nation with a population feeling the need for territorial outlets would have used such an opportunity with more or even with as much restraint."

"The problems that may cause difficulties between Japan on the one hand and America or British Dominions on the other, are well known; they are very real and there are some points in them that are fixed and insuperable; but it is right, and may be helpful, that those who are preoccupied with these matters should bear in mind that the Government of Japan was for us for many years a fair, honourable, and loyal Ally, and that, thanks to its forbearance, no serious friction arose between us and the United States on Pacific questions during the war."

This then, is the answer to the charges that Japan took advantage of the war to encroach on British rights in China. In the Twenty One Demands, Japan desired certain railway rights in the Yangtsze Valley which seemed to conflict with the doctrine of British supremacy in that region, a doctrine that had been several times vitiated by Britain's own acquiesence in international railway cooperation; flouted by France in the Pukow Harbor loan and laughed at by Russia operating through Belgium in acquiring railway rights which enabled the Bear to have an outlet on the Yangtsze opposite Shanghai. What others could do with impunity became a crime against international morality and a flagrant breach of faith in the case of Japan.

Viscount Grey sets the record straight as far as the British Government is concerned. His testimony is of immense value and interest to those Americans who professed to see in the Anglo-Japanese alliance a menace that might bring Great Britain to the aid of Japan in the event of hostilities originating in some phase of the racial issue. **"Thanks to Japan's forbearance, no serious friction arose between us and the United States on Pacific questions during the war"......Japan always understood and smoothed the path."**

This most remarkable statement will not be lost on thinking Americans.

Wilson and the Secret Treaties

There is one important matter which Viscount Grey fails to throw light upon; the secret treaties which gave to Japan the Pacific possessions of Germany north of the equator and the transfer of the German rights in Shantung. Aside from the slight mention that her prospective acquisition of German territory must not extend beyond certain bounds, there is no direct reference in his book to the engagement entered into. It was urged at the Peace Conference that the American Government had no official knowledge of these treaties prior to their being sprung at Paris, that China had been betrayed by the Allies before her entrance into the war America's failure to make good her promises to stand by China at the conference was laid to the door of these treaties and our delegation made the most of an argument which exposed the State Department to the charge of gross incompetency. Further light is now thrown on this episode in the latest biography of Woodrow Wilson written by William Allen White. He says:

"He (Wilson) knew of the secret treaties which brought Italy and Japan into the War and which bound the Allies to a programme of loot and reprisal. Letters are extant from Balfour which seem to prove that Wilson knew of these treaties. Colonel House explained to the press in December 1918, in discussing his chief's presence in Europe, that the President knew of the secret treaties. The treaties were published in 1918 and were of general circulation in America and of common knowledge. And because of them, the President must have been moved to go to Paris with the Peace Commission to undo, if he could, at the Peace Conference, the work of these treaties."

Wilson went to Eurpe accompanied by a shipload of scientists of one sort or another whose knowledge might be needed in playing Providence to the map of Europe. This Yankee knight errant walked down the gangplank of the *George Washington* at Brest followed by a desperate crew of college professors in horn-rimmed glasses, carrying text-books, enclyclopædias, maps, charts, graphs, statistics and all sorts of library crow-bars with which to pry up the boundaries of Europe and move them around in the interests of justice as seen through the Fourteen Points."

Not one of them outside their chief knew of the secret treaties, common knowledge to the man-in-the-street. Yet to save his own prestige the Man-with-the-single-track-mind remained silent when an outraged American public vented its anger on the heads of the Allied premiers who negotiated the deal with Japan over Shantung. Had Wilson come out frankly at Paris and taken his crew of college professors into his full confidence, accepting the realities of the situation instead of playing the role of Don Quixote tilting at the wind-mills, there would have been no Shantung issue at Paris, the American senate would have been deprived of its heavy ammunition in killing the treaty and the subsequent disgraceful campaign against Japan which forced the Washington Conference three years later, would never have occurred.

G. B. R.

New Motorships for Australasia

The success of motorships for long voyages having been abundantly proved, it is by no means surprising that many of the new orders are for that type of vessel. It has now just been officially announced that the Commonwealth and Dominion Line has placed orders for two new motorships with Messrs. Swan, Hunter and Wigham Richardson.

In addition to the two new motorships ordered by the company, it is understood that a third is under consideration. It is to be engined with Doxford oil engines, but the order has not as yet been definitely placed. It may be in another part of the country.

The fleet of the Commonwealth and Dominion Line at present numbers 26 vessels. Two of these are motorships and their first voyages have proved very satisfactory.

The two motor vessels now ordered are to have different engines. One will be engined with the Doxford oil engine, built by Messrs. William Doxford and Sons, Sunderland, and the other with the Sulzer oil engine, constructed by the Wallsend Slipway and Engineering Company.

All the three vessels are to be of the same size, viz., 475-ft. by 63-ft., and will be of about 8,000 tons gross, with a net deadweight tonnage of 11,600 tons. Their speed will be about 14 knots fully loaded.

They will be constructed for their owners regular service between this country Australia and New Zealand, and about 330,000 cubic feet of cargo space in each vessel will be insulated for the carriage of dairy produce and frozen meat and fruit.

A number of saloon passengers will be carried. The new vessels will be on the service in the middle of 1927.

The New Zealand service is a good one for motorships. But it is quite a different story on the Australian route. Here oil prices are high, and the oil rings seem to maintain high prices, even at Aden. On the other hand, the Panama route is particularly suitable for motor vessels, owing to the price of oil supplies. The eventual progress of the motor ship now rests with the price of oil If a reduction in price is noted on the principal shipping routes then more and more owners will order motorships. It is only the economic factor which is governing the development of the motorship.

The Orient Steam Navigation Company has placed an order with Vickers, Ltd., for a passenger steamer similar in dimensions to the *Orama* and *Otranto* recently built by the same firm. The *Orama* and *Otranto* are steamships of about 25,000 tons gross each, fitted with geared steam turbines and for burning oil fuel.

China and the League of Nations

Fight for a Permanent Seat in the Council and Revision of Treaties

Rejects League's Assistance

By George Bronson Rea

FOREWORD

How short is human memory. At Paris, in 1919, China nearly killed the League of Nations at its birth. Italy had threatened to leave the Conference over Fiume and Japan followed with a similar threat if her program for the return of Shantung to China was rejected. With these two great powers outside, the League was doomed if no compromise could be found. Wilson gave way on Shantung in order to save the League which he felt assured would protect the rights of China and justify the sacrifice of the principle. Colonel House was the only American commissioner who sided with his chief. The others repudiated his leadership.

China's refusal to accept the Shantung Decision in the spirit it was made, broke Wilson's heart and started him along the path which led to his breakdown and untimely death. Her public protests and violent criticisms undermined his prestige in America and provided Lodge and a hostile Senate with the arguments that rejected the treaty and kept America out of the League.

In 1919, the world distrusted Japan. It was alleged that she could not be trusted to live up to her pledged word in the Council of Five and the cry that went up to heaven from China and her friends drove the last nail in the coffin of Wilson's hopes. It kept America out of the League, while China slipped quietly in. On the wave of sympathy and anti-Japanese sentiment which carried China from Versailles to Washington, she reached the peak of her diplomatic successes. Japan, however, has justified the faith that Wilson reposed in her. She lived up to her bargain doing all and even more than she promised to do.

The world moves on. The nation which so roundly abused Japan and denied that she could be trusted to live up to a gentleman's agreement, accepted the gifts of the Washington Conference as a moral victory and then proceeded to demonstrate its own unworthiness and inability to adhere to its solemn treaties. China is discredited while Japan is now a real force in the world with her delegate presiding over the council of the League of Nations, lending the weight of his support to China's claims whenever they have come before that body for consideration. America is still out of the League, whose aid China scornfully rejected as worthless when Wilson confided her future to its protection.

Conditions have changed. China now appeals to the League for reconsideration of the "unequal treaties;" demands as a right a seat on the permanent council; yet declines to listen to any suggestion that the League might assist her to rehabilitate her finances. Like the old-world diplomats who gathered around the conference table at Paris and hailed the League as a heaven-sent instrument for acquiring material consessions in the Peace, China's interest in the League lies in what she can get out of it. Her delegates are playing a stiff game on a very weak hand. Will she lay down or wait until her bluff is called?

For called it will be. Her aspirations to a permanent seat in the council may be knocked in the head by the committee for revising the covenant in some amendment providing for the principle of rotation to operate between non-permanent members, or it may be that the committee will recommend that all states in arrears for a certain period be suspended. A significant incident arose in the House of Commons yesterday, when the Foreign Secretary was asked to give a list of the unpaid contributions to the League, his answer revealing that the total arrears amounted to nearly six million gold francs. The countries responsible for these unpaid contributions were; Bolivia, China, Guatemala, Honduras, Liberia, Nicaragua, Paraguay, Peru, Rumania and Salvador, all except two which come under the Monroe Doctrine and by reason of which cannot be coerced. In response to a further question as to whether there was anything in the constitution of the League by which states in arrears for a certain period do not take their seats, the Foreign Secretary replied, "there is not." The only practical way to enforce payment would seem therefore to be in suspension, a penalty that China is openly inviting by her present tactics.

IN November 1920, at a time when China was the golden-haired pet of America and hopes were centered around her rapid rehabilitation and industrial development, the wise old heads of the League of Nations elected her to a seat on the council, a distinction which she held with considerable credit until 1923. Internal troubles at home and failure on more than one occasion to pay her contribution to the general expenses, caused her to be let out in favor of Czechoslovakia. Those three years on the inside were sufficient to give China an idea of her power in international affairs and sharpen her desire permanently to occupy one of the exalted seats in the council. With her government the football of rival war-lords, the country reduced to poverty and unable to meet its foreign obligations, China preserves her face by telling the League that these are her own private affairs which do not concern the other powers or impair her status in the family of the nations. And she gets away with it.

China's Claims to a Council Seat

China's position at the recent meeting at Geneva was very forcibly and ably set forth by Minister Chu Chao-hsin in terms which permitted of no misunderstanding. China was in full sympathy with increasing the League Council because as now constituted this limited body is not truly representative of the world's great racial divisions. China heartily favored the admission of Germany into the League and to a seat on the permanent council as this was the sole purpose for calling the extraordinary session, but when other nations sought to take advantage of this occasion to advance claims for preferment, China very firmly let it be known that her candidacy would also have to be favorably acted upon at the same time.

In defending China's claims, Minister Chu declared that after the disastrous experiences of the great war (the direct result of rivalry in armaments), this was not the moment for military strength to take precedence in determining the status of a nation. First consideration, he said, should be given to its resources, productivity, politics, society, civilization, culture, history, race, population, geographical position and other pacific elements, all of which China possessed to a high degree, fully qualifying her to permanent representation in the council of the league of nations, which after all, he pointed out, is in no sense a regional or continental grouping, but a universal body. If, however, such a reasonable and just claim should be set aside or ignored, then the world must be prepared to admit that military power constitutes the sole requisite for international supremacy; that armed force alone can establish equality amongst the nations. Then China, which has always disparaged the use of force as embodied in modern engines of warfare, will be compelled to rely on her armies to re-establish her legitimate rights which for too long a time have been denied to her by other powers. It is true, he added, that China's huge armies have only served up to the present as pawns in the struggles between rival tuchuns for political supremacy, but these internal wars may cease at any moment. Then, these armies which have acquired considerable experience in fighting each other will unite in a solid front to face the danger from without. Mr. Chu closed his brief but disquieting presentation of China's case with an earnest appeal to the sympathies of those who love justice and could envisage the future trend of international relations.

The Menace of an Armed China

Whether meant as a warning or an attempt to bluff the assembly, his words were taken to heart and pondered over. There is a general feeling that whereas the Chinese soldier is still far behind the European in efficiency, every year he is becoming a better and better fighting machine. It is recalled that it is only a few short years since Chinese warfare was comparatively bloodless. Equipped with modern weapons and with all the latest mechanical and chemical auxiliaries for wholesale slaughter, drilled and disciplined under competent leaders, the Chinese are now killing each other on a large scale. Thinking people are growing alarmed at the menace involved in encouraging a peaceful nation to throw overboard its traditions and enter into the mad race for military power that has proved the scourage of Europe.

There is a story repeated by Viscount Grey in his recent autobiography, which exactly fits the present trend of thought on the future of China. A Japanese visiting England after the close of the Russo-Japanese war, finding himself and his nation to be objects of admiration, reflected thus upon the course of events: "Yes," he said, "we used to be a nation of artists; our art was really very good; you called us barbarians then. Now our art is not so good as it was, but we have learned how to kill, and you say we are civilized." China is following in the footsteps of Japan. According to these standards in a few years the Chinese will be the most civilized people in the world. They will then assert their proper influence in international affairs.

League Sympathy

In every instance when China has advanced her claims before the league she has received the cordial support of Japan. In fact China's unswerving attitude and strong tactical position has been an embarrassing obstacle for the major European powers to surmount for, had the claims of Poland, Spain or Brazil been thrashed out on the floor of the assembly, Japan would have aligned herself with her Asiatic neighbor and between them thrown the monkey-wrench into the League machinery that Brazil ultimately wielded with such disastrous effect. Japan, however, is not the sole friend of China in the League. It is difficult perhaps for those who have an intimate knowledge of the present hopelessness of China's internal affairs to appreciate the deep feeling of sympathy extended to her in her hour of trial by her fellow members in tne League. There is a general and sincere desire to be of some real assistance should China invite it, supplemented by a warm comradeship for her delegate, who has carried the burden of preserving her international status over a period when her government has miserably failed to live up to the hopes reposed in it and neglected to pay its quota of the general expenses.

This sentiment, typical of the League spirit, has been immeasurably strengthened through the personality of China's delegates and their appeals to fundamental principles in dealing with the problems of Asia. Foreigners in China in close touch with realities, are inclined to underestimate the value of the services of China's diplomats abroad, upon whose somewhat inexperienced shoulders have fallen the tremendous task of preserving her international footing by ignoring or glossing over the facts. During their terms as delegates, Dr. Wellington Koo and Alfred Sze created a most favorable impression in League circles while Dr. Wang Chung-wei at the Hague is recognized as one of the most brilliant jurists at the World Court. Koo and Sze however won their diplomatic spurs at a time when America and Great Britain were China's champions, carrying them through the mazes of international intrigue to their culminating success at the Washington Conference. Since that date, China's failure to take advantage of her newly won position has shaken the confidence of her friends and created an atmosphere of doubt as to the wisdom of having befriended her pending a termination to her domestic troubles.

H. E. Chu Chao-hsin, Chinese Minister to Rome and Delegate to the League of Nations. Mr. Chu is considered by his collegues in the League as one of the most Promising Diplomats of the Far East

Chu's Popularity

The brunt of replying to these criticisms and maintaining the dignity of the Chinese Government in European political circles has developed upon Mr. Chu Chao-hsin, as China's Charge d'Affaires to Great Britain and delegate in the League of Nations. Chu's position has been extremely difficult, for no matter how diplomatically

China's case is presented his statements and arguments have invariably been contradicted by reports of actual conditions. On more than one occasion Mr. Chu's veracity has been impugned and his activities scathingly denounced for disregarding the facts. Operating under such a handicap and standing almost alone in carrying China's fight, he has won the confidence and sympathy of his League colleagues by his fearless tactics and appeals to principles which the League cannot ignore. Unlike his better known predecessors, Mr. Chu has waged his battle without the stimulating aid of a favorable press or the friendly protection of powerful foreign statesmen. His colleagues in the League with a fuller knowledge of these handicaps have been more generous than his critics. Their almost unanimous verdict is that Mr. Chu Chao-hsin is one of the most promising diplomats of the Far East, a man who will go far on his own merits.

The "Unequal Treaties"

Mr. Chu's appeal for a reconsideration of the so-called "unequal treaties" at the general meeting of the League held last September, was remarkable for its straight-forward and condensed presentation of China's case. The appeal was based on the provisions of Article 19 of the Covenant of the League, which reads :—

> "The Assembly may from time to time advise the reconsideration by Members of the League of treaties which have become inapplicable and the consideration of international conditions whose continuance might endanger the peace of the world."

This appeal was not accompanied by a resolution for the assembly to vote upon, so was interpreted as being more in the nature of a tactful warning that unless China's legitimate desires were given due consideration, the time would arrive when she would take the initiative and solve her problems in her own way. It is true perhaps as far as the public and the records of the League are concerned that Mr. Chu did all the talking on this occasion, but it is equally true that his appeal had a remarkable effect upon the majority of the assembled delegates who urged him to submit a definite resolution that could be acted upon. Conferences with the British, French and Italian delegates also disclosed a sympathetic and favorable sentiment towards China's appeal. In fact, everything indicated that if the resolution was brought up at the next general assembly it would meet with unanimous approval. It looked as though China was scheduled to score another success but the identical nigger-in-the-wood-pile which defeated the entrance of Germany into the League at the eleventh hour operated in the indentical manner to deprive China of this opportunity to have her case impartially considered. A few days after the three big powers had expressed their willingness favorably to consider China's resolution, Minister Chu received a visit from the Polish delegate who pointed out in the course of the conversation that Poland would be obliged to veto the Chinese resolution if based upon Article 19 of the covenant. This article, he said, if invoked in favor of China, would sooner or later be invoked by Germany in an attempt to negative or undermine the efficacy of the Versailles treaties upon which the existence of his country as an independent state was founded. Rather than consent to the establishment of this dangerous precedent, Poland would exercise her power and veto the claims of China. Several modifications of the wording of the proposed resolution were suggested as means of avoiding any mention of Article 19, and it was even proposed that China should rest her case upon a direct appeal to the assembly without reference to the covenant. It was brought home very forcibly to Mr. Chu that the sole provision in the covenant which China could legally invoke to bring about a reconsideration of the treaties was denied to her because of the attitude of one second-rate European state having no direct interest either in China or the treaties. Brazil has been bitterly scored for interfering in and upsetting the affairs of Europe in which she had no direct interest, but here is an identical case in which a small European state with nothing at stake, used the same instrument to defeat the legitimate aspirations of Asia.

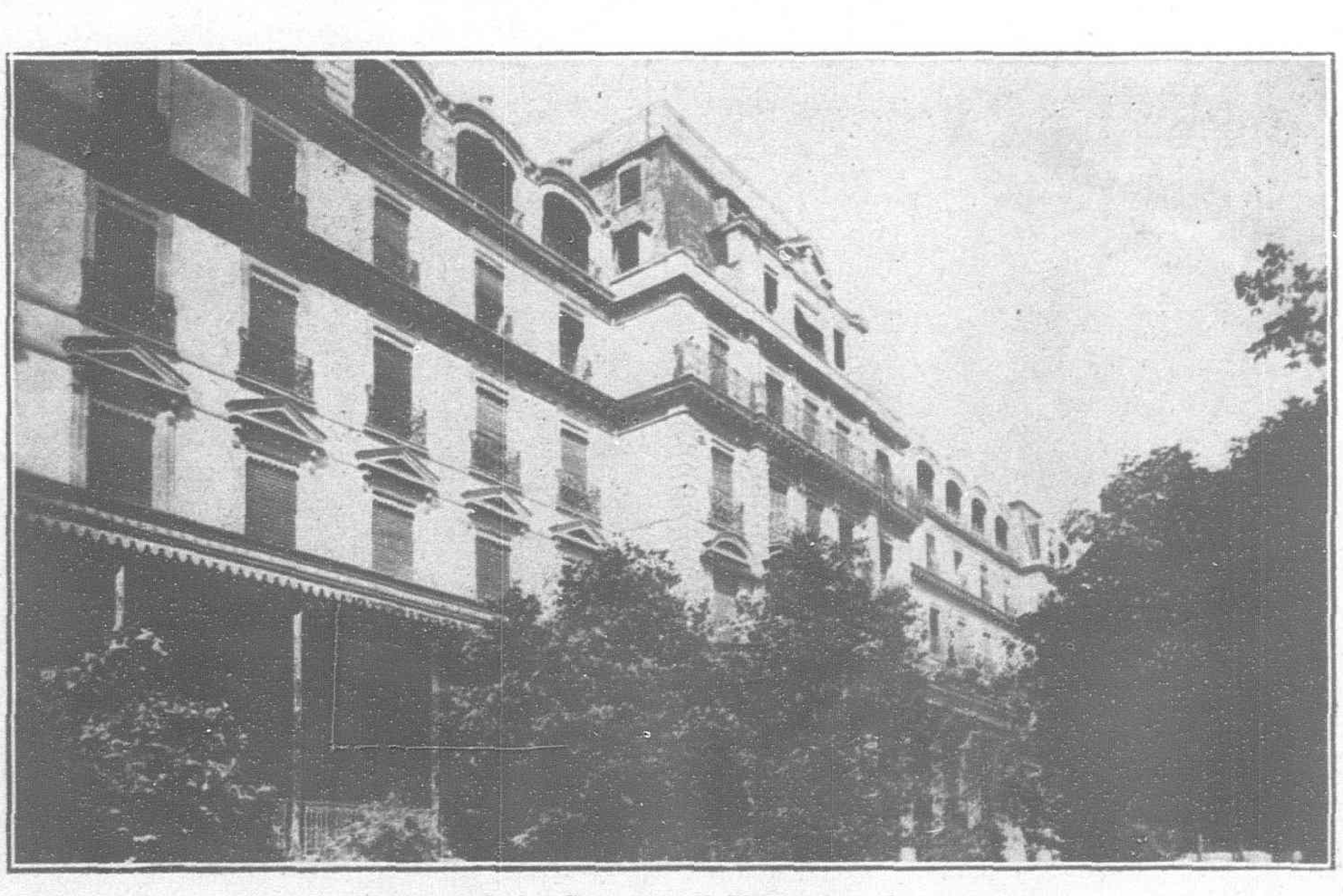
Brazil's action in breaking up the League meeting at Geneva, has raised the question in acute form of what is South America doing in the League, anyhow? The feeling is growing that the position of the South American states in the League is altogether anomalous in so much as they have full power to interfere in European affairs, without having the slightest responsibility, as sheltered behind the Monroe Doctrine, they cannot be coerced by the League if they do wrong. China's experience reveals that although none of the great powers desire openly to go on record as opposing her claims for fear of trade reprisals, some one amongst them passed the buck to a smaller nation who has nothing to fear by inviting China's displeasure. Poland was undoubtedly a catspaw. Whose, is a matter for conjecture.

Committee for Reorganizing the League

This experience, far from putting a damper on China's activities, only served to harden her determination to obtain recognition. Her success along these lines can be measured by the recent invitation extended to her by the League Council to a seat in the commission created for revising the covenant. This commission is composed of the ten regular council members with the addition of five new seats ; Germany, Poland, Switzerland, Argentina and China. When China's name came up for consideration, objections were raised in some quarters on the grounds that her internal instability and financial breakdown disqualified her for such distinction, a view reflected by several members of the Assembly. It began to look as though these arguments might prevail and China be excluded from this commission, when Mr. Chu promptly put forward his counter arguement.

China's Sledge-Hammer Diplomacy

He took the ground that China's internal affairs and lack of a stable government was her own business having absolutely no bearing on her status as a sovereign state or her qualifications as a member of the League. If China was denied a seat on the commission on such arguments, he would retaliate and oppose the right of other powers to similar distinction on the same grounds. He pointed out that there was hardly a country represented in the League which enjoyed a stable government and with possibly the sole exception of Great Britain and China, not one of his colleagues in the Assembly could give an assurance that they would represent their governments at the next general session and furthermore not one could guarantee a continuity of foreign policy on the part of his government that would fit in with the League's program. Practically every government in Europe, he said, was unstable ; some had discarded their liberal parliamentary systems for a dictatorship and even while the Geneva Conference was in session, at least three European cabinets had fallen. As to China's financial troubles, it was unfortunate that she could not meet her foreign obligations, but she had not repudicated them nor had she evinced any unwillingness to pay. If conceded full sovereignty within her own



Palace of the League of Nation at Geneva house by a revision of the existing treaties, giving her power to regulate her import tariff and devise other necessary measures for raising revenue, she would soon stabilize her government and satisfy her creditors. China was not shirking her financial obligations, which was more than some European powers could say. Her foreign debt was small compared with the war debts of certain European states who up to the present had shown no disposition to arrive at a settlement with their creditors. And that apparently was that.

Mr. Chu's sledge-hammer comeback convinced the critics that they were monkeying with the business end of a buzz-saw in opposing China's aspirations. China was invited to appoint her delegate to sit on the commission and in a few days Peking telegraphed instructions for Mr. Chu to see the job through. The inclusion of China and Argentina on this important commission foreshadows their admission to permanent seats in the expanded Council. The inclusion of Argentina is significant. In October 1920, Argentina parted company with the League under most dramatic circumstances, her delegation walking out of the assembly following upon the rejection of two motions it had submitted, one of which contemplated the abolition of all permanent seats on the council and the other urged the immediate admission of all the ex-enemy states, including Germany. As China on every possible occasion has insisted on her right to a seat in the permanent council, it seems a foregone conclusion that if the new commission reports favorably on its enlargement, China as well as Argentina will be included as members.

With Japan firmly seated in the inner council, the elevation of China to this select circle will go far towards establishing a more equitable representation of the world's great geographical divisions in the League, a recognition that military strength is not the sole qualification for a nation's status in international affairs. Such a departure would be more in keeping with the League spirit and dispel suspicions that the assembly is merely a debating society subservient to the great powers which dictate the rules of the game through their permanent instrument—the council.

China Rejects League Aid

It is difficult at this juncture to express with any degree of accuracy China's exact position in regard to the League. She vehemently insists on recognition of her quality with the great powers to regulate world affairs without possessing the means to enforce decisions should the application of force become necessary. On the other hand, China rejects the League's interference in her own affairs, turning down cold the friendly suggestion that it might assist in putting her on her feet. For it has been urged on more than one occasion that the rehabilitation of China might be accomplished in the same manner that Austria and Hungary were assisted by loans guaranteed by the League. The mechanism of control as applied in Austria consisted in the appointment of a Commissioner-General whose duty it was to colaborate with the Austrian Government to ensure the carrying out of the reform program and to supervise its execution. He was to be selected from some state not bordering upon Austria or having any interest in the loan. In addition, there is a Committee of Control representing the Guaranteeing Governments with voting power proportionate to their guarantees, to watch their special interests. In the case of Austria, a Dutchman (Dr. Zimmermann) was appointed the League's Commissioner-General and within a year after the reform program was put into operation, Austria's currency had become the most stable in Europe and a budget equilibrium was established. In the case of Hungary, an American (Mr. Jeremiah Smith) was appointed Commissioner-General with the same gratifying results as with Austria.

There are many sincere friends of China who believe that some similar scheme devised to meet her special needs is the only solution to the present tangle. In view of the difficulties surrounding the working out of the consortium program, arising in part from China's refusal to recognize this body, it is contended that the machinery of the League provides the only alternative that will not wound her susceptibilities. It is urged that in side-tracking the consortium for the League, China need have no fear that undue preferment in the supervision of her finances would be given to any of the consortium powers or to those whose past policies may have been abnoxious to her. These powers might subscribe to and guarantee their proportionate shares of the loan, while the execution of the reform program would be supervised by an expert from some country having no special interest in China, one who would colaborate with the Chinese Government as the direct representative of the League of Nations.

China, however, up to the present has taken the attitude that there is no parallel between her case and the of Austria or Hungary. Her currency, while depreciated in the copper coinage, is not yet worthless paper. Her silver coinage is still on a sound basis, subject only to such fluctuations as are caused by legitimate trade and silver movements. Notwithstanding her chaotic political condition, foreign trade steadily increases from year to year. Therefore, China says, her problem is not one which calls desperately for outside financial help, but one which can be readily adjusted if she is conceded complete tariff autonomy which will enable her to raise revenues sufficient to meet all outstanding obligations and cover her working expenses.

Furthermore, China emphatically refuses to consider any financial scheme that in any way further impairs her complete administrative independence by the appointment of a foreign debt superviser. She professes to see little difference between a Commissioner-General of the League of Nations and a British Inspector-General of Customs or Salt revenues, as in the present state of world finance, any reconstruction loan issued under the auspices of the League, must be raised largely in America or Great Britain, giving to these guaranteeing governments a preponderating influence in the Committee of Control appointed to watch their special interests.

In plain words, China believes that she is quite competent to manage her own affairs if conceded the opportunity to regulate her tariff and raise internal revenues without violating some "unequal treaty" that now stands in her way. She rejects the proferred assistance held out by a disinterested League yet demands a supervising position in regulating its affairs, one which it would be impossible for her to live up to if called upon to contribute her share of the burdens, either financial or military.

China Must Accept Responsibility

These pretensions may elevate China to a certain point in world affairs, but they have their limits. They may conceivably carry her to a permanent seat in the League Council, but it is clear that any nation which insists upon its right to such distinction, must be prepared to share the responsibilities of the position, a role which China cannot hope to fill for many years. Equality in debate must go hand in hand with equality in enforcing the League's mandates. This inescapable law of international co-operation is lost sight of by China in demanding favors at a time she is in no position to reciprocate. In rejecting the suggestion that the League might assist in reforming and stabilizing her finances, China invites the loss of her only disinterested friend in the event her own efforts along these lines prove unsuccessful. For it goes without saying, that it will be many long years before foreign capital will hazard the risks surrounding investments in China unless adequate guarantees in some form of supervision are made part of the loan agreement. It is equally certain that for many long years any important foreign loan to China must be raised in the markets of the consortium powers. If China persists in refusing to recognize or do business with the consortium then her only hope of outside financial assistance lies in the dissolution of the consortium and a return to a free-for-all scramble, or, the creation of some other instrument that will fully guarantee the bondholders that the reforms upon which the safety of their investment is based, will be faithfully carried out. The only substitute for the consortium that would be acceptable to the bondholders is the League of Nations, of which China is not only a member state but aspires to a seat in its permanent directorate.

For the moment, China may persuade herself and others that she can meet all her financial necessities by making the foreigner pay for them through raising the customs tariff and the creation of monopolies and other taxes after the "unequal treaties" are cancelled. The time must however inevitably arrive when her government will seek outside financial assistance for specific purposes, such as the building of railways, public works and perhaps a refunding of the foreign debt. Then, China must do business with the consortium or the League of Nations.

From the viewpoint of those who have the most to lose, those whose investments in China are already depreciated or rendered almost valueless by present conditions, it is much wiser for China to come out frankly and on her own initiative invite the League's assistances as the safest and quickest way to reestablish her credit. The British government has sacrificed the interests of its subjects in China to the higher principles of non-intervention in the affairs of that country. Co-operation with America has failed to bring tangible results. The consortium can do nothing and America alone will never take the responsibility involved in rehabilitating China. America insists upon international co-operation for the execution of which the consortium is her chosen instrument. The only remedy in sight that will save foreign investments in China, rehabilitate her finances and relieve her government from the fear of intervention or further impairment of its administrative independence by any one power or group of powers, seems to be the friendly and disinterested trusteeship of the League of Nations invoked at the invitation of China herself.

(Continued on page 228).

Income Tax Exemption for American Business Men Abroad

By O. K. Davis, Secretary, National Foreign Trade Council.

WITH the signature by President Coolidge of the 1926 Tax Revison Bill, Americans who live in other countries and are engaged there in efforts to expand the foreign trade of the United States, step at last up on a plane of tax equality with their competitors of other nationalities. This is due to the inclusion in this bill of a provision which has been sought continuously during the last six years by the National Foreign Trade Council on behalf of American chambers of commerce abroad. Under the clause as it has now passed *bona fide* non-residents during six months or more of the taxable year are relieved from tax upon income earned in the country of residence.

Six years ago the National Foreign Trade Council took this matter up with Congress and the Treasury Department at the urgent solicitation of the American Chamber of Commerce in Shanghai, Buenos Aires, Rio de Janeiro and elsewhere. The first approach to Congress was met with a demand for proof that other trading nations do not tax their nationals resident in foreign countries upon income earned in the country of residence. The effort to supply that proof involved the Foreign Trade Council in a labor of nearly a year. The State Department was unable to furnish the tax laws of other countries. The Treasury Department and the Department of Justice were appealed to in vain. The Library of Congress had copies of one or two ancient British tax laws and no more. So the Council prepared a questionnaire which was sent out through the State Department and the Department of Commerce to our consuls and commercial attaches in foreign countries, calling upon them for the tax laws of the countries where they were stationed. It took five or six months to accumulate the material and another five or six months was involved in the careful examination of these laws. The result of all this work was the proof that the United States was the only nation taxing its nationals abroad in this way.

This tax operated as a serious handicap in the efforts to expand American foreign trade because it was regarded by Americans who went abroad in the interest of business as an unfair discrimination against them. It has always been difficult to get competent Americans to go abroad for long periods of residence in the promotion of business, and this tax discrimination added to that difficulty. Yet it has always been obvious that American salesmanship and American management of distribution centers of our goods in foreign countries was of the highest importance in expanding the foreign sales of our products.

Five years ago the Treasury Department took the matter up and largely through its support a provision was included in the Tax Revision Bill of 1921, as reported to the House, which would have exempted foreign traders in a certain degree. That bill, however, included corporations as well as individuals. The entire provision was stricken out in the floor of the Senate just before the bill passed the Senate. Since that time the Foreign Trade Council has been plugging away in the efford to get a provision included in one of the subsequent tax revision bills. It has confined its efforts, however, to securing relief for individuals. The Chamber of Commerce of the United States, the National Association of Manufacturers, and some other trade organizations, took the matter up also and gradually a considerable measure of support of the proposition was developed in Congress.

When the Ways and Means Committee of the House reported the present bill it contained a provision which while it recognized the principle, limited the relief simply to only those who were engaged in selling American products in other countries. This result was not satisfactory to any one. The business men understood at once that only a small fraction of the Americans living in other countries and engaged in business there would be relieved. Yet they understood clearly that in many cases it is the efforts of such men who make possible the expanding sales of American products. The experience of the automobile men is a case in point.

American automobile makers began their efforts in the export trade with the attempt to sell their machines and were not successful, but when they set up service stations abroad they promptly produced very satisfactory results. Yet, under the provision reported by the House, the men connected with the service stations who were, after all, the most important factor in American automobile salesmanship in foreign countries, would not have been affected.

The House adopted the provision as reported by the Ways and Means Committee and immediately there was a violent protest on the part of American Chambers of Commerce in Rio, Havana and London. Dr. R. P. Momsen, President of the American Chamber in Rio, was in the United States at the time and he submitted a vigorous protest to the Finance Committee of the Senate.

These protests were confusing to the Finance Committee whose members saw themselves being criticized by Americans in foreign countries for doing what they thought would be applauded by such Americans. Thereupon they struck the whole provision out of the bill.

Friends of the measure, however, including representatives of the Foreign Trade Council and Dr. Momsen, went to Washington and succeeded in getting opportunity to explain the matter fully to members of the Finance Committee and several Senators.

Senator Jones of Washington, chairman of the powerful committee on commerce of the Senate, made a trip to South America last year and in visits at Rio, Montevideo and Buenos Aires had become familiar with the problem on the spot. Senator Jones introduced an amendment covering the situation fully, which was called up by Senator Smoot and accepted by the Finance Committee just before the final fight on the bill in the Senate.

One of the difficulties in securing this legislation has been the fact that the total amount of income involved was so small in the aggregate. The Treasury Department has not included it in any of the estimates of revenue reduction it has submitted to either house of Congress. The irritation it produced among Americans abroad, however, was a serious detriment to the conduct of our foreign trade. By this legislation one more of the handicaps on American Foreign Trade has been removed, and a substantial step forward has been made possible in the promotion of our foreign business.

The Construction of the Chinese Eastern Railway Company

A Russian View

By A. Borissoff

This article was written for the "Far Eastern Review" by one of the agents of the Economical Section of B. V. Ostroumoff's organization, which at the present time, is engaged in extensive construction and industrial work in Manchuria. Mr. Ostroumoff was formerly Managing Director of the Chinese Eastern Railway.

THE construction of the Great Trans-Siberian Railway was going in full swing, quickly nearing the town of Chita. And still the question of the further direction, which this great trunk-line was to assume towards the East, in the direction of Vladivostok, remained unsolved. A plan of constructing the railway following the Amur river along the frontiers, between Russia and Manchuria, existed, but this was a round about way.

The Amur river enters the Russian border at sharp angle. This would make the line too long. The fact, naturally, gave birth to the idea of following the straight line towards Vladivostok, across Manchuria ; this would shorten the railway by about 2,000 versts.

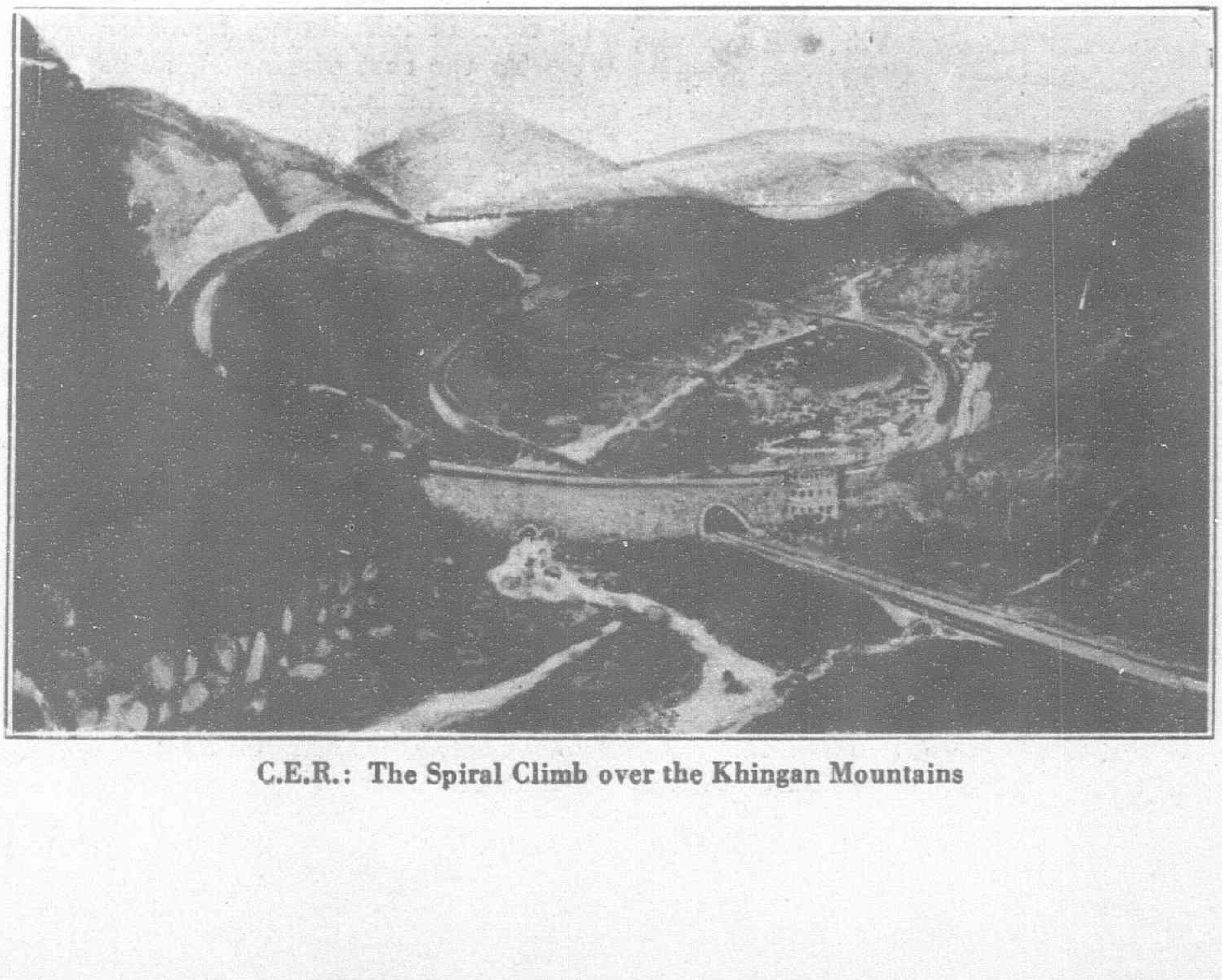
But the problem of obtaining a concession for the construction of a Russian railway on foreign territory appeared to be uncommonly difficult.

And yet the aim pursued by the constructors of the great trunk line imperatively demanded that this shortest way should be followed. Emperor Alexander III on whose initiative this huge construction was started, considered, that the Siberian Railway was to form a link between Russia and Europe on one side and Japan and the Far East on the other, becoming one of the great transit highways of the world. In the eyes of the Emperor the Siberian railway was to have an exclusively economic importance. Its importance for Russia was in the possibility of a direct communication between the Russian Maritime Province and the other parts of the country, and for China and Japan—a link between these countries and Europe.

Still a third variant of the direction, which should be adopted by the future railway, existed. Badmaieff, a Buriat physician at that time residing in Petrograd, strongly recommended the construction of the railway in the direction from Verhneoudinsk to Urga and then on through Peking towards one of the ports of the Pacific. This project proposed by the Buriat doctor, who well knew the life of the Far East and the political organisation of the Chinese Empire, had, undoubtedly, great advantages. A more detailed study of the project would, probably, have modified it and excluded the first supposition of the Doctor to construct the line in the direction of Peking. The Chinese capital would, probably, have been left aside and a shorter way—along the Mongolian territory—via Dolon-nor, Jehol and Chin-chow—adopted. The direction would, certainly, have been shorter and more convenient for the great world transit highway across Siberia and Mongolia. But this project, probably, frightened Doctor Badmaieff's contemporaries by its novelty and daring.

It was for Count S. J. Witte, at that time Minister of Finance of Russia, to make the final choice between the different variants proposed, as the whole work of the construction of the railway was, by the will of Emperor Alexander II—entrusted to him.

It may be seen from Count Witte's writing, that Badmaieff's project was not sufficiently well studied and understood by him. Witte well knew that Badmaieff was working on questions, relating to the Far Eastern problems. He admitted, that the Doctor "was, undoubtedly, a very clever man," but, in Witte's opinion, his work was "always attached to some intrigues or political questions," that he tried "to make his occupations a source of all kinds of financial affairs." For these reasons Witte tried to keep Badmaieff away from the final solution of the question of the direction to be chosen for the new railway and ceased all relations with him. His project was abandoned. And yet, many of the reasons the Doctor put up in favour of his project, were worthy of consideration. Badmaieff tried to prove, that the Vladivostok direction could only have a secondary importance, as compared to the direction proposed by him, and he was right. Considering the Great Siberian Railway as a world trunk line, Badmaieff well understood, that the direction recommended by him would be shorter and more convenient. Vladivostok freezes in winter and this great drawback does not exist in the other ports of the Pacific. The coast of the Liaotung Bay, one of the points, which was to be the terminal of the new line, was, certainly, more centrally located as to world trade and, therefore, the services rendered by this direction of the Trans-Siberian would have been much greater in the direction of Vladivostok.



C.E.R.: The Spiral Climb over the Khingan Mountains

Count Witte, in addition to his lack of personal sympathy towards the author of the project, had two reasons, according to his own words, for not supporting Doctor Badmaieff's project. First, Witte was thinking of the development of the Russian port of Vladivostok, and second—he considered that the construction of a Russian railway to Peking, would raise all Europe against the Russian Government.

It must be noted, however, that this latter apprehension of Count Witte was, certainly, not as well founded as it appeared to him. Very probably, after a more thorough study of the project and its detailed discussion with the Chinese Government, the Peking direction would have been abandoned and the railway would have followed a more direct line towards the Pacific coast, leaving Peking aside.

Out of the two remaining variants for the construction of this part of the Siberian railway, Count Witte chose the shortest direction—across Manchuria.

It was necessary to obtain China's approval to this project and Witte resolved, for this purpose, to take advantage of the visit of the Chinese high dignitary, Li Hung-chang to Moscow. Li Hung-chang was to assist at the festitivites of Emperor Nicolas II coronation in Moscow, as representative of the Chinese Emperor.

The political situation at that time was extremely favorable to such negotiations. Russia had only a short time ago rendered two great services to China. According to the treaty of Shimonoseki, concluded between Japan and China after the end of the Sino-Japanese war, the results of which had proved disastrous to China, Japan demanded the annexation of the Liaotung Peninsula. Russia supported China at the time and the principle of the intangebility of Chinese territory proclaimed by her, was, at that time, supported by the other European powers and the United States of America. Japan was forced to yield and to accept a financial compensation, instead of the territory it was hoping to obtain, according to the Shimonoseki treaty.

After this, owing to guarantees given by Russia, China was able to obtain a loan in France, granted by four French Banks.

The impression of these two friendly services, rendered to China by Russia, were still fresh in the minds of all Chinese. Witte reminded Li Hung-chang of them, when starting his negotiations with him and tried to impress upon him the importance the Trans-Siberian railway would have for China, especially should that railway be continued through Manchuria. Witte told him that, in case of any international difficulties, which China might experience Russian support could only prove effective, in case Russia would be able to transport her military forces into China quickly and efficiently from European Russia and the Maritime Province. Military assistance otherwise would always come too late if no railway existed, as had been the case during the Sino-Japanese war.

Witte, likewise, emphasized the great importance of the new railway for the economical development of the Russian and Chinese province through which it was to run. Japan, on her side, could have nothing against the construction of a railway line across Manchuria, furthermore that country was interested in the most speedy achievement of the Siberian railway. This railway was to give Japan the possibility of coming nearer to European markets and the countries of the Far East. The great technical and industrial progress Japan had attained in late years stimulated her friendly attitude towards the construction of the railway.

In his memoires Count Witte remarks, " of course Li Hung-chang brought up various obstacles." But a careful study of these negotiations shows that on the contrary Li Hung-chang's attitude towards these negotiations was most friendly. In fact, no dissensions that could be considered as obstacles cropped up during the negotiations ; it was only a difference between European and Asiatic ideology in questions of International Law that came to light and a different understanding by the two parties of what was admissible and acceptable for China in the way of the construction of a railway by foreigners on Chinese territory.

It was not Li Hung-chang's first experience in the dominion of railway construction. He had worked for thirty years on these questions and he certainly has his own well formed opinion on the question of railway construction in China.

For the first time in 1863 had Li Hung-chang to discuss the question of the construction of foreign railways in China—at that time he was Governor of the Province of Kiang-Su. The Shanghai foreign firms had entered a plea for permission to construct a railway between Shanghai and Soochow. The funds for the construction were to be supplied by foreign capitalists. Li Hung-chang flatly refused to grant the permission requested. His reason was the over-population of the country and the difficulties that would be experienced in obtaining land for the railway line. He, likewise, indicated, the unfriendly attitude of the Chinese population towards foreigners. Li Hung-chang voiced his apprehension that the misunderstanding, which would certainly arise in the process of the expropriation of land for the railway and different other circumstances, might render this public feeling against foreigners more acute. Li Hung-chang considered, in principle, that China was certainly in need of railways, but that these ought to be Chinese, not foreign. Later on, when he became Viceroy of Chile, he granted a Chinese company the permission for the construction of a railway line to the Kaiping coal mines ; this line, later on, was prolonged as far as Tientsin. In the spring of 1893 this construction was continued towards Chinchow. Li Hung-chang's plan was to, later on, continue that railway from Chinchow to Moukden, via Sin-Min-Tin. It was, later on, proposed to continue that line to Hunchun.

The line planned was to run through the parts of Manchuria, which, at that time, were populated by Chinese. In those days, the Liaotung peninsula was densely, populated by Chinese, as well as the coast of the Liaodun Bay to the east of the Willow edge. To the north of Kaiuan Chinese colonies became less numerous and in North Manchuria formed only rare oasises, mostly in the vicinity of the few cities, which existed in that part of the country. In the confines of Mongolia, Chinese settlements existed only on the highway between Tsitsihar and Bodoune and in the vicinity of that town. The line of Hunchun, proposed by Li Hung-chang was to cut off the part of Manchuria populated by Chinese,—from the others. The region where the Russian railway was supposed to pass remained as yet untouched by Chinese colonisation. This region was divided into many autonomous principalities, part of which were under the sovereignity of the Manchuria dynasty and partly forming old Manchurian lands, which had at all times belonged to that dynasty.

The western part of that region, from the Russian border to the Hin-gan was occupied by Barga, which had its own Governor and enjoyed broad autonomy. The Hin-gan region was populated by a nomad tribe of Orochons, ruled by their own dignitary. In fact their dependence from the central government was purely nominal.

Further from the Hin-gan to the river Nonni were lands populated by Solons and Danours, ruled by their chiefs. These tribes were organised into different colonies and in military and political matters were supposed to depend from the Touchoun of Heilungkiang. Although these tribes, likewise, enjoyed autonomy, still their dependence from the Manchurian powers was much greater than that of the inhabitants of Barga. Further to the east of Tsitsihar went the Mongolian dominions of the Princes Dourbet, Gorlos and Minnai-Olt. These dominions went nearly as far as Harbin. The Mongolian princes were considered to be sovereigns by right of inheritance, but dependent from the Bogdo-Khan.

To the east of Harbin, as far as the Russian border—there were Manchurian possessions. All that region, at the time, was not a Chinese province, neither as to population, nor as to government. This part of the country was a conglomeration of small government formation, which formed a part of the Chinese Empire, but, owing to the special conditions on which they submitted to the Chinese Emperor, enjoying special autonomous rights.

This circumstance was evidently fully discounted by Li Hung-chang in his negotiations with the Russian Government, but Russian officials were absolutely unaware of the facts and considered China as a usual unified State instead of looking upon it as on a complex of states—or a union. In the Russian mind the name of China was synonimous of the whole Chinese Empire—understanding all parts of the Empire as an undevisable unit. Instead of this, the Chinese Empire consisted of several states such as : Manchuria, Mongolia, Thibet, China and Turkestan, which were united under the rule of the same dynasty.

This different understanding by the two contracting parties of the constitution of the Chinese Empire was, naturally, bound to have an influence on the negotiations ; misunderstandings arose, which both sides were inclined to explain as the desire of the other side to create difficulties in a matter, which both of them considered desirable and both thought perfectly clear; in reality, a grave misunderstanding between the two sides existed all along.

The Asiatic method of thought in the matter of the construction of a railway in Manchuria was clearly manifested in the negotiations between Li Hung-chang and Count Witte, as well as in the contract for the construction of the Chinese Eastern Railway. Nevertheless, the fact that the negotiating parties did not have a sufficient knowledge of each other, created the result, that a question perfectly clear to Chinese was incomprehensible to the Russians and vice versa. The Chinese often insisted, that certain paragraphs be inserted in the contract, which, in their mind, clearly defined the conditions of the understanding. The Russians, on their side, considered these paragraphs unnecessary and superfluous, thinking that they only represented the usual Chinese formulas of Eastern eloquence. This was the cause that at the very conclusion of the contract the two parties differently understood its conditions.

Count Witte's Memoires, now published, in their parts relating to the conclusion of the contract, clearly show this difference in the understanding of the various clauses of the pact.

Count Witte states, that Li Hung-chang, before beginning negotiations on the details of the contract, gave him to understand, that China's consent to the construction of the railway could only be obtained if Li Hung-chang had the assurance that the conclusion of the contract was desired by the Russian Emperor himself. A minister in Russia had not the right to negotiate any important questions with a representative of a foreign nation without having previously obtained the Imperial sanction of such negotiations: it was, therefore, clear, that the question of the construction of a Russian railway in Manchuria raised by Witte, had been previously submitted to the Emperor and was in conformity with his wishes. Li Hung-chang's desire, therefore, appeared rather strange to Witte. But Li Hung-chang considered, that China's consent to the construction of such a railway would be an act of special importance, that whilst allowing the Russians to penetrate into his country, the Chinese Emperor must have full assurance, that this step would have no bad consequences for China, and, therefore, wanted to obtain a full guarantee of Russia's sincere friendship towards China. The Emperor alone could give such an assurance. The formula "for the sake of the friendship, which has now begun," which rendered it possible to consent to all kinds of concessions for the sake of fortifying the links of peaceful friendship was an old one and for centuries had been used in the diplomatic relations between China and Russia. Li Hung-chang's desire to have a confirmation from the Emperor himself of the promises given by this formula was a result of his understanding, that this was the only real guarantee, which could be given, that Russia would keep her promise, resulting from the contract signed. Witte's Memoires and all the events that followed closely, show that Witte himself and the governing circles in Russia looked upon the desire of the Chinese dignitary as on a pure formality, demanded by the ritual of the usual Chinese ceremonies. The spirit of Li Hung-chang's desire to hear the Emperor's own words expressing his wish to have a Russian railway built in Manchuria in return for the services rendered to China by Russia, was never understood.

Count Witte states, that during the discussion of the details of the understanding, Li Hung-chang placed as first conditions the demand, that the railway should be built by a private Company. In no case would he accept, that the latter should be built by the Government or should belong to the State.

The contract on the building of the railway clearly emphasizes this point, running as follows:

"The Chinese Government . . . . grants the construction and the running of the railway to the Russo-Chinese Bank on the following conditions: the Russo-Chinese Bank undertakes to form a Company under the name of Chinese Eastern Railway Company for the construction and exploitation of said railway. The seal, which will be used by the Company will be granted to it by the Chinese Government."

According to the Asiatic minds, an understanding of the contract, the mutual relations of the Russian Government, the Chinese Government and the Railway Company—could not be more clearly defined. Li Hung-chang considered, that the text of the understanding, drawn up by the Russians and himself, completely eliminated the Russian Government from the construction and exploitation of the Chinese Eastern Railway. According to the contract, the Chinese Government grants the construction of the railway to the private Russo-Chinese Bank, which, if necessary, finances the railway. This Bank, having the trust of the Chinese Government, must form a private Company, which must build and run the railway; the Russian Government must take no part whatever in the exploitation of the line. In this way, the Company which, as is clearly said in the contract, to allow its functioning in Chinese territory, gives it its seal; this, if expressed in the European manner, meant, that the Chinese Government grants the Company its power and rights. In this way, the railway Company obtained its right of administration in the railway territory. These administrative rights obtained as a result of the seal by the Chinese Government, were in absolute conformity with the usual Asiatic custom. They were absolutely identical to the rights of the ruler of Barga, of the Manchurian Zien-Ziuns or the Mongolian Princes in their respective territories, and placed the Railway Company in the same situation towards the Chinese Government, which was occupied by these princes. As a result it was, likewise, understood that the Company was to be responsible before the Government for the administration of the railway zone in conformity with the rights obtained. In the Chinese mind, the fact that the Russian Government had agreed to the paragraph of the contract saying that the Company would receive its seal from the Chinese Government—meant that Russia had once for all abandoned its rights to interfere in the Company's business and had agreed to its full submission to the Chinese Government.

In Li Hung-chang's eyes the fact, that the Railway Company received grants of land, which it needed and enjoyed the exclusive right of administration in the railway zone, did not represent any special privilege to Russian subjects in the confines of the Chinese Empire. The Chinese mind clearly understood, that the Railway Company was placed in the same position, which was enjoyed by all the other government formations and administrative units existing in Manchuria, which had obtained their rights and power through the granting them of their respective seals by the Chinese Government.

The exact conformity of the Company's acts, its obligations, assumed in front of the Chinese Government had a special importance in the eyes of Li Hung-chang. To prevent the possibility for the Company to interpret in too broad a manner its administrative and other rights in the railway zone, the following clause was inserted into the contract: "The President of the Company will be appointed by the Chinese Government......... the President's special duty will be to see to it, that the Bank and the Company should fulfill exactly their obligations assumed towards the Chinese Government...... " (Paragraph I of the Contract).

In this way, the Chinese side of the two contracting parties considered that the dependence of the Chinese Eastern Railway Company from the Chinese Government and its responsibility, in case of infingement of rights obtained, or the unfulfillment of its obligations assumed, were fully established and guaranteed by the Contract.

Unfortunately, the Russian negotiations had an absolutely different understanding of the mutual relations between China and Russia, which resulted from the pact concluded in 1896. Count Witte, in his Memoires, gives a detailed picture of the way in which the Russian Government and himself understood the rights granted to Russia by the contract.

Witte, speaking of the desires voiced by the Chinese at the conclusion of the contract says: "The Chinese Eastern Railway Company had, therefore to be formed. This Company, certainly, always was, and now is—fully under the control and at the orders of the Government. The only difference is that, as the Company is officially registered as a private concern, and as all private Companies are controlled by the Ministry of Finance, the employees of the Chinese Eastern Railway are not governmental employees, but are in the same situation as employees of private railway companies, and are considered to be temporarily attached to the private Chinese Eastern Railway......... Then we will have the railway zone at our disposal for the necessities of the new line. We will be absolute masters in this zone, which means that we shall have the right of maintaining our own police and railway guard.........In this zone Russia, or more exactly the Chinese Eastern Railway—will be the sole ruler........." (Count Witte's Memoires, volume I, page 48).

Count Witte and the public opinion on the great advantages obtained by Russia in the railway zone, which made that country fully master in the territory, did not consider these advantages as a diplomatic victory of Russia, whose diplomacy had lured the Chinese into signing a contract highly advantageous to Russia, the real purport and meaning of which were not fully understood by China. Witte considered, that these advantages were only a logical result of the whole complex of the negotiations. It was in the understanding of the meaning of these negotiations by each of the contracting parties, that the European and Asiatic points of view on the whole question most clearly appeared. And both contracting parties were right from their own point of view. The question of the principles, on which were based the relations of the Railway Company towards the Russian and Chinese Governments had never been discussed. The way these relations were understood by the contracting parties, or what lawful forms these should assume, was not defined during the negotiations. Both parties were fully satisfied having entered into the text of the contract the formulas, which, in their opinion, would clearly establish the meaning of all details of the misunderstanding. The Chinese considered this formula to be the clause of the contract establishing the granting of the seal to the Company by the Chinese Government.

The Russians, on their side, gave the greatest importance to paragraph 5 of the contract, establishing that: " all crimes must be judged and legal procedure, etc., organised on the railway zone by the local authorities on the basis of the principles established by international treaties."

The pacts and treatise concluded between China and Russia clearly established the extraterritoriality of Russian subjects on Chinese territory. Therefore, Russians, as well as all other foreigners were not subject to the jurisdiction of Chinese Courts or to the organs of Chinese Administration. Paragraph 5 of the contract confined this right for all Russians in the railway zone. Paragraph 6 of the same contract still enlarged these rights by granting the Railway Company the administration of the territory given to the Railway. For this reason Count Witte and the whole Russian Government considered, that the Railway Company, having obtained full powers from the Chinese Government to develop its activities in the Chinese Eastern Railway Zone, continued to remain under the absolute control and full jurisdiction of the organs of the Russian Government. Therefore, as the Company was to become full master in the railway zone, owing to the contract signed with the Chinese Government, this gave automatically the same rights to the Chinese Government.

The question of who really retained all rights in the railway zone—became most intricate and complicated in view of the fact that it was quite unusual for the Chinese Government to abandon part of its own rights to a private foreign company. Having ceded its rights of administration to a private foreign Company, the Chinese Government could no longer be considered as the subject of right, but at the same time sovereign rights in the railway Zone, as on a part of Chinese territory continued to belong to China.

According to the pact of 1896 and the contract on the construction of the Chinese Eastern Railway, the Chinese Government having granted the Company the lands, which it needed, had, simultaneously ceded to the Company the exclusive and absolute right of administration in this zone. This cession of rights to the Company had a personal character and, therefore, the Russian Government, from a strictly legal point of view, did not obtain the right of the establishment of its own administrative regulations in the railway zone.

For this reason the Railway Company having received the right of sole and exclusive administration of the railway zone from the Chinese Government working on a territory under Chinese sovereignity, should be, it appeared, in certain relations to China.

On the other hand, it was certainly impossible to ignore the facts, that the Company itself formed according to the laws of the Russian Government and that the Russian subjects—agents and employees of the Company, enjoying the right of extraterritoriality continued to remain in all respects under Russian jurisdiction. It was, therefore, impossible, to think of the possibility that the Company formed of Russian subjects could disobey the orders of the National Government.

It was in view of these considerations, that the Russian statesmen were of the definite opinion, according to the contract on the construction of the Chinese Eastern Railway, Russia had obtained all the rights in the railway zone.

Nevertheless, in the beginning of the existence of the Railway, the Railway Company was really the ruling force in the railway zone. The military forces, for the protection of the railway were created by the Company and under the latter's orders. In fact, these forces were nothing but freely hired employees of the Company.

The uniform of the employees of the railway guard, the way they were enrolled—all being officers and soldiers having ended their obligatory military service and now in reserve,—all this proved that they were not a military force, but just the Company's employees, the hiring of which was considered necessary in the interests of the administration of the railway zone. This was in conformity with paragraph 5 of the contract.

Some of the employees of the railway guard were entrusted with police duties. The existence of such an armed guard, as an agent of the Company, was not against the contract and fully in conformity with Asiatic customs. The same rights were enjoyed by all other government formations in Manchuria, which had obtained their seals, which they used in their administrative function from the Chinese Government.

When signing the agreement on the construction of the Chinese Eastern Railway, Li Hung-chang had inserted another vital condition. The railway line was to cross Manchuria from China to Vladivostok, following as far as possible, the shortest line. At the time, as it appears from Count Witte's Memoires, Li Hung-chang had explained the motives of this advice, which, at the same time, was a demand.

Witte says in his Memoires: " Li Hung-chang, with whom I had become quite friendly several times repeated to me that, being a friend of Russia, he could in no way advise Russia to go south of the railway line, which was to bind the Trans-Siberian with Vladivostok. In his opinion, our moving southward could create such political disturbances and unexpected incidents in the Chinese masses, absolutely unknown to foreigners and looking upon every white man as upon a foe, that a similar step could have the most sad and unexpected results for both China and Russia.

This advice of Li Hung-chang had a very great political importance. In fact, Li Hung-chang in his conversations with Witte, tried to explain to him the necessity for Russia to establish beforehand a definite zone of her influence in the Far East. An unbounded agrandisment of this zone could have the most serious consequences, spoil the friendly feelings existing between China and Russia. As mentioned above, the Liaotung Peninsula, Kwantung especially, was densely populated by Chinese. The colonisation was an old one, Chinese settlers had lived here for centuries. The Chinese Government had the intention of broadening the zone of colonisation in South Manchuria. The extent of the colonisation planned was made clear by Li Hung-chang's project of the building of a railway line between Chinchow and Hunchun. In accordance with Chinese custom, the Chinese Government considered all territories populated by Chinese as its belonging, as on an enlargement of the confines of Chinese. The appearance of Russians in a zone intended for colonisation, especially in one which had already been colonised, could always be considered by the Chinese Government as a vital menace to the colonisation policy. The granting of land tracts to the railway could easily create an unfriendly feeling in the minds of the Chinese living in Manchuria; these Chinese were to the Russians in relations quite different from those they were towards the various Manchuria and Mongolian tribes.

All this compelled Li Hung-chang to consider that to prevent possible misunderstandings, it was absolutely necessary for Russia to define the sphere of her influence in Manchuria. With the construction of the railway Russia was to come into closer contract with the Mongolian and Tungus tribes, populating North Manchuria. China wished to maintain its sole influence in the Liaotung Peninsula and the neighbouring regions of South Manchuria.

Unfortunately, all details of the life and political organisation in the Far East were unknown in Russia. The friendly feelings between the contracting parties were sincere, the negotiations proceeded in an open and friendly manner, giving full consideration to all desires voiced by the opposite party. All desires expressed and speeches made by both parties were accurately translated from one language into another and nevertheless, the lack of mutual knowledge of the contracting parties—China and Russia—created the situation that, notwithstanding the translations made, the parties continued to speak two different languages.

All later events, the occupation of Tsingtao by the Germans, of Port Arthur by the Russians and the construction of the Southern Line of the Chinese Eastern Railway—brought about an armed conflict between Russia and China. The re-establishment of law and order in the country did not re-establish the former friendly relations. The Russian interpretation of the contract became still broader. A policy of expansion was inaugurated in the railway zone, based on the allegation that all power and right in the zone belonged to Russia.

The Russian revolution and the fall of her national prestige brought about a change in the opposite direction. China assumed Russia's policy of political expansion. This intricate situation was in no way cleared up by the new understanding, concerning the Chinese Eastern Railway, concluded by China with the Soviet Government. On the contrary, it still more obscured the situation, breaking the basic principles of the construction of the railway, laid out in the contract on the construction of the line, by declaring that the railway belongs not to a private Company, but to the Russian Government in conjunction with the Government of the Chinese Republic.

* * *

Steel on the Japanese Railway

THE Imperial Government Railways of Japan apparently do not spare trouble in investigating the materials that they must rely upon for the all-important maintenance of an efficient traveling service. Their recently conducted tests of steel rails supervised by Mr. Yoshio Uyemura indicate a very thorough examination and should prove of considerable value to both makers and users. Since the I.G.R. system has grown to its present dimensions within only forty years one can but marvel at the skill and perseverance which their engineers have shown in the face of almost insuperable difficulties.

It was not much more than forty years ago when Japan first determined to discard her old isolation policy and to come into line with Western ideas. From the outset it was necessary that the Government should consult and accept the specialist opinions of foreign engineers and adopt their methods to the peculiar conditions in Japan. As each new process received its trial in other countries so too did Japan fall in line and subject it to test in this country. The replacement of an entire rail system is an extremely costly item and the I.G.R. is to be congratulated on the way it is preparing to tackle the proposition.

During the past forty years tremendous strides have been made in the production of steel and during this period many new processes have been tried and abandoned. Those who are acquainted with the production of steel, and also those who may have but caught a glimpse of the colossal Government Steel Works at Yawata, know the enormous capital cost of new furnaces and can appreciate the difficulties to be overcome by steel manufacturers.

Acid Bessemer, Basic Bessemer, Siemens, Acid Open Hearth and Basic Open Hearth Processes have all taken their turn in the progress of science and indeed the products of each process has still some peculiar advantage to recommend it for particular uses; but it is now generally accepted that Basic Open Hearth Steel is undoubtedly the best for all structural purposes.

Mr. Uyemura's report confirms the above statement but perhaps leaves a rather unfortunate impression with laymen that some American and British makers produce only poor quality steel.

Two of the worlds oldest established firms, Messrs. Carnegie and Messrs. Bolckow Vaughan, have received particular mention. Both these firms have been in the forefront with experimental work and have produced steel of every kind. As new processes were discovered they lost no time in equipping their works and making the products, thus giving every possible advantage in the choice of materials. Other firms, less favorably placed financially, were unable to follow their lead, and thus escaped the unfortunate experience, often the lot of pioneers, of having incurred heavy expenditures without deriving much ultimate personal benefit.

Messrs. Bolckow Vaughan, whose works line the River Tees at Middles-brough, England, and are as large as those at Tawata, produce 800,000 tons of pig iron and 500,000 tons of steel ingots per annum. This firm was founded in 1851 and its history has been marked by a singularly progressive attitude. When the epoch-making discovery of Bessemer first became known it was Bolckow Vaughan & Co., who first adopted the new process in the Cleveland district. Later they placed their staff and plant at the disposal of two eminent scientists the outcome of which was the Basic Bessemer process that has produced so much of the early good quality steel.

Years later, the development of the Siemens Process brought about striking improvement in the quality of steel. With the adoption of the Basic Open Hearth Furnace a process was at last found which could hardly be improved upon and it is not generally accepted that Open Hearth Steel made under conditions such as are found at the Bolckow Vaughan Works has no rival.

Exhaustive tests and experiments have proved that Basic Open Hearth is actually just as capable of resisting prolonged strains as acid open hearth, so that the advantage claimed by the latter is now rather discounted. In the near future, when the industrial life of Japan is highly developed, far more heavy traffic must be borne by the railroads. This will require a stronger subgrade construction and will call for a very high quality rail which combines toughness with a fair degree of hardness. Mr. Uyemura in his report states that high carbon steel rails are too brittle for Japanese conditions of lighter wheel loads and that he recommended a steel less hard but tough enough to bear up under the exacting conditions of temperature and the weaker subgrade which has so far been the rule in Japan.

Toughness gives rugged strength to a rail and prevents it being injured by accidental misuse; hardness gives surface wearing value, but the hardest type of rails on account of their brittleness should be used on first-class subgrade which is constantly maintained. The I.G.R. engineers will do well in keeping in touch with Western construction methods and products thus benefiting from the experience of their manufacture and adding to their own valuable sources of information.

Messrs. Bolckow Vaughan are fully prepared to answer any criticism of experts and are confident in submitting their products to any test whatever. As manufacturers of steel rails they claim a reputation second to none, and this is proved by the supply of tramrails to such important systems as London County Council, Glasgow, Manchester and Dublin and a regular supply of ordinary steel rails to British and foreign railway companies. Defects in previous manufacturing processes which were discovered only by the test of time have now been definitely eradicated and the new furnaces turn out a steel rail which will certainly meet the most exacting conditions.

New Passenger Vessel for Singapore-Penang Trade

Towards the end of February an order was placed through Messrs. Alfred Holt & Company, for the Straits Steamship Company, Ltd., with Messrs. Vickers, Ltd., Barrow, for a fast turbine driven two screw steamer for the Singapore and Penang passenger trade.

It is of interest to note that this is the third order booked by Messrs. Vickers within the last few weeks. They include a Donaldson motor vessel and a 20,000 tons Orient liner. On March 16 the firm will launch the new British cruiser *Cumberland*.

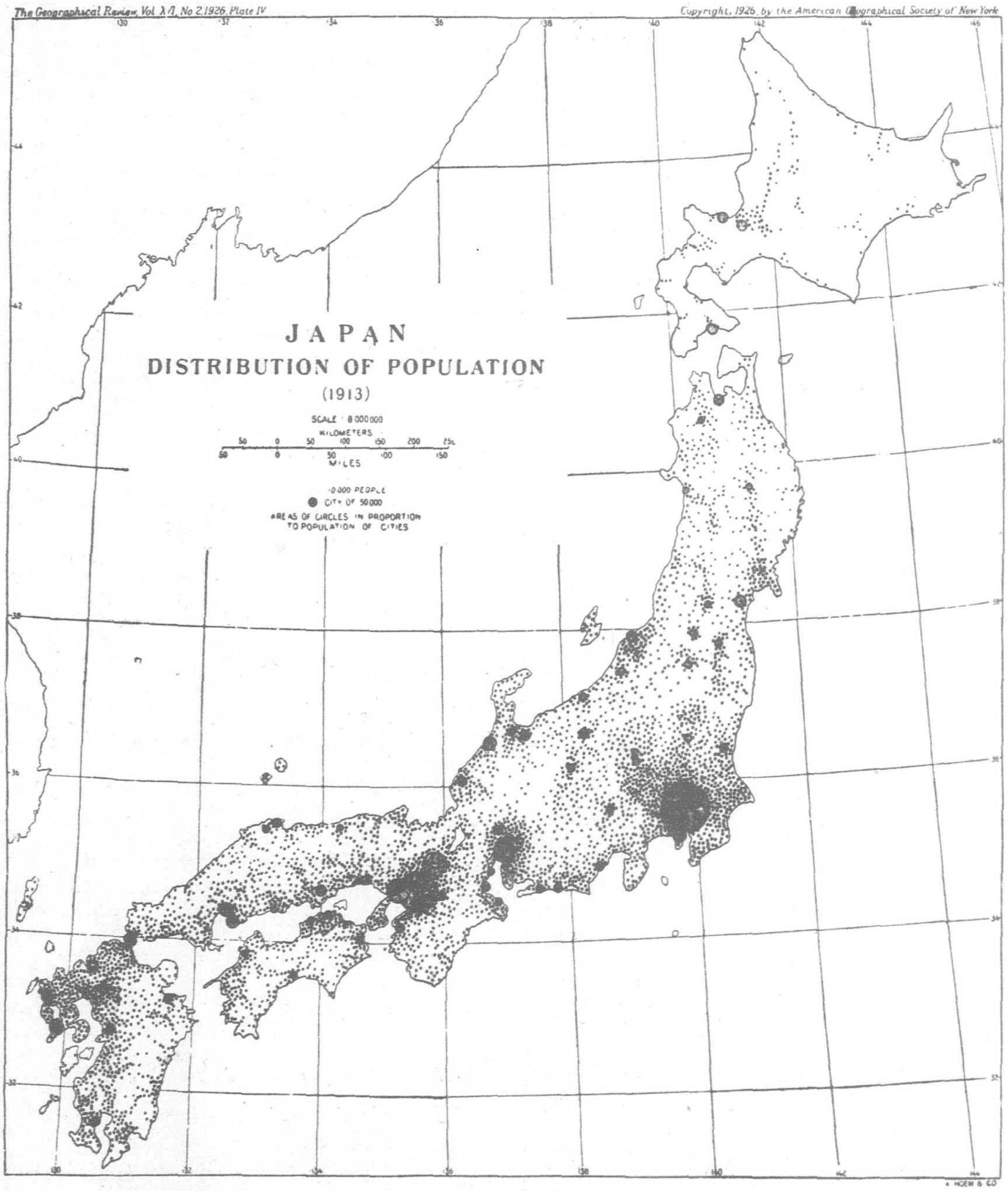
New Vessels for Dutch East Indies Trade

Messrs. L. Smit & Company's International Tug Company, of Rotterdam, have recently placed orders for the construction of two seagoing tugs of 800 and 900 i.h.p. respectively with Messrs. L. Smit and Zoon, Kinderdijk, and P. Smit, Junior's Engineering and Shipbuilding Company of Rotterdam. The Koninklijke Paketvaart Maatschappiji, of Amsterdam, whose orders for new tonnage to be used in their inter-island services in the Netherlands East Indies given in the past year have figured large in the books of the leading shipbuilders in the Netherlands, have called for tenders for the construction of five ships, all of the same size and type. This is considered an excellent opportunity for Netherlands builders who have improved their internal organization, enabling them to build high class ships in series to demonstrate the value of such improvements.

The Distribution of the Population of Japan

MUCH controversial energy has been expended on the question of Japan's excessive population and its political implications. Anyone, who has ever been in Japan knows that the county is over—populated. That is an obvious fact. But there are those who would have the Japanese live on mountain peaks and on the surface of the Pacific Ocean rather than recognize that the arable land of the country is fast becoming so densely populated as to be incapable of supporting the people. The exception is Hokkaido, but colonization in the north must be slow as the climate is difficult for Japanese.

It is with interest, therefore, that we turn to a map prepared for the "Geographical Review," by Professor Wesley Coulter of the University of Chicago who notes :


The Geographical Review, Vol XVI, No 2, 1926, Plate IV

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The map reflects the relation of the distribution and density of population to relief. The thickly populated plains stand out in sharp contrast to the sparsely peopled mountains. The Kwanto Plain, on the island of Honshiu, with about six million people, is the largest area of dense population in Japan. The Mino-Owari Plain and the Kinai Plain, on the same island, also are densely populated. On the island of Shikoku, the plain in Sanuki province in the north may be identified by its large number of dots. In Kiushiu, the larger areas of dense population are on the plains in the northern and northwestern parts of the island. All the plains referred to are characterized by intensive agriculture. Many small agricultural villages are scattered over them. On many parts of them two crops are raised each year, rice during the summer and wheat and barley during the winter. Near the larger cities of the plains market gardening is carried on, and there three crops a year are produced. The density of the agricultural population of Japan is suggested by the fact that, on the average, the cultivated land per family is less than three acres.

The sparse population of the mountainous regions as compared with that of the plains may be illustrated by noting that, whereas the province of Hida in central Honshiu has a population of only 34 per square kilometer, Mushashi, on the Kwanto Plain, has 649 per square kilometer. The general decrease in density of population towards the northern part of Japan is effectively shown. In Hokkaido much tillable land still is forested; the cultivated area per family there is seven and one-half acres.

Thirty-five cities of Japan have a population of more than 50,000, and thirty-four range from 24,102 to 47,295. Tokyo, the largest city, has more than 2,000,000 inhabitants. The larger cities are on the larger plains which face the Pacific Ocean. Tokyo, Yokohama, and Yokosuka are on the Kwanto Plain ; Nagoya is on the Mino-Owari Plain ; and Kobe, Osaka, and Kyoto are on the Kinai Plain. These cities on the east-central coast of Honshiu lead in manufactures and commerce. The localization of the urban population is strikingly exhibited by the map.

A Change in Name

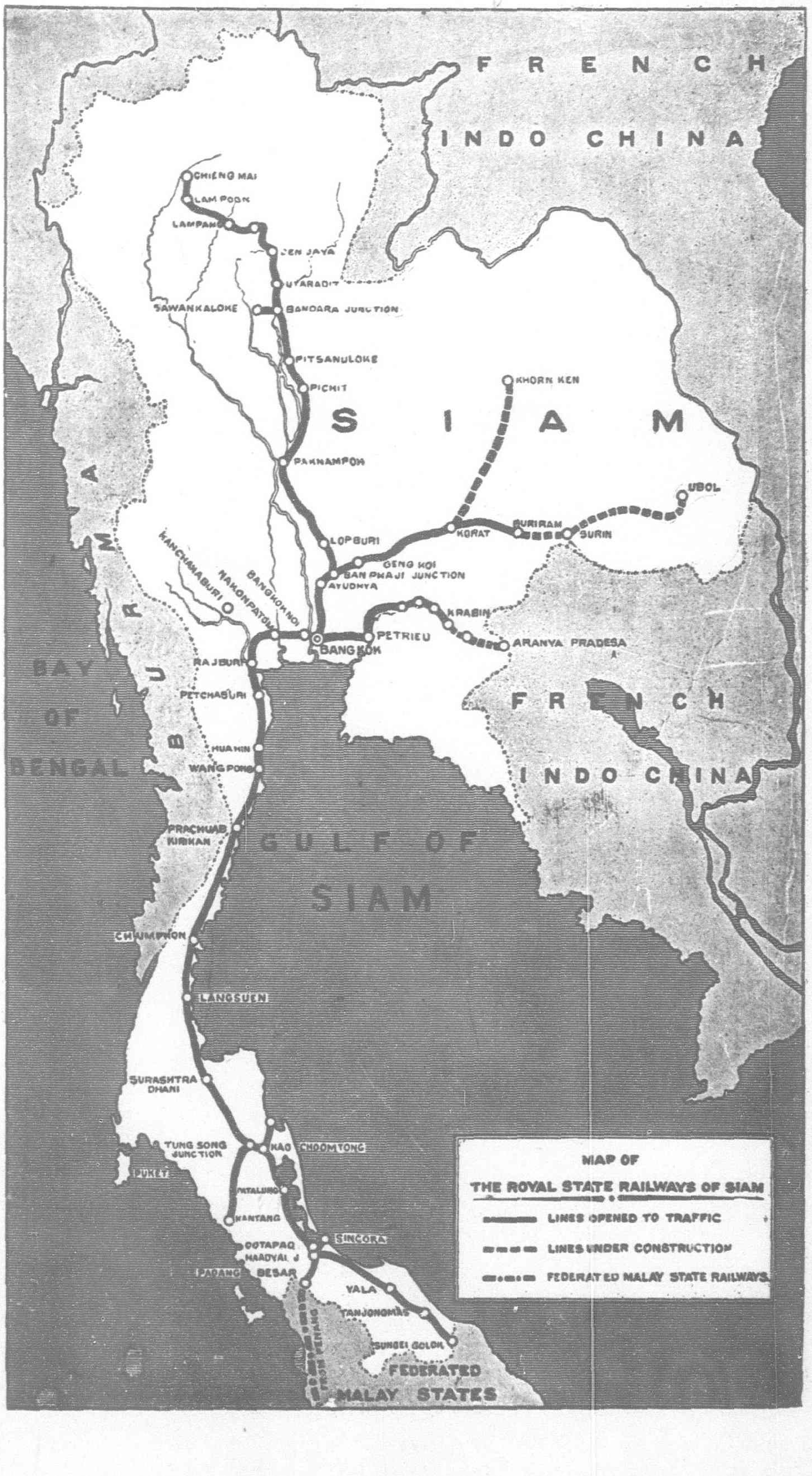
In 1869 when this company was incorporated as The Goulds Manufacturing Company, it built a wide variety of products. To-day, it has *one* product—Goulds Pumps. From a sales and advertising viewpoint the company considers it such a great advantage to link its product with its corporate name, that it has decided to change its name to Goulds Pumps Incorporated.

There is no change in organization, business policy or ownership. The board of directors, offices, managers, and personnel remain the same. This change is effective April 1, 1926.

The Royal State Railways of Siam

By *J. M. Wright*

IN far too many cases our knowledge of Siam is confined to the data obtainable from the small-scale maps and compressed paragraphs of the school geography; and little apology need therefore be made for prefacing this review of Siamese railway accomplishment by a brief summary of the physical features, population and economic activities of its Asiatic kingdom. An ever-increasing influence upon the country's railway development has been exercised by these factors, and they have now taken their rightful position as the guiding features of her transportation policy.

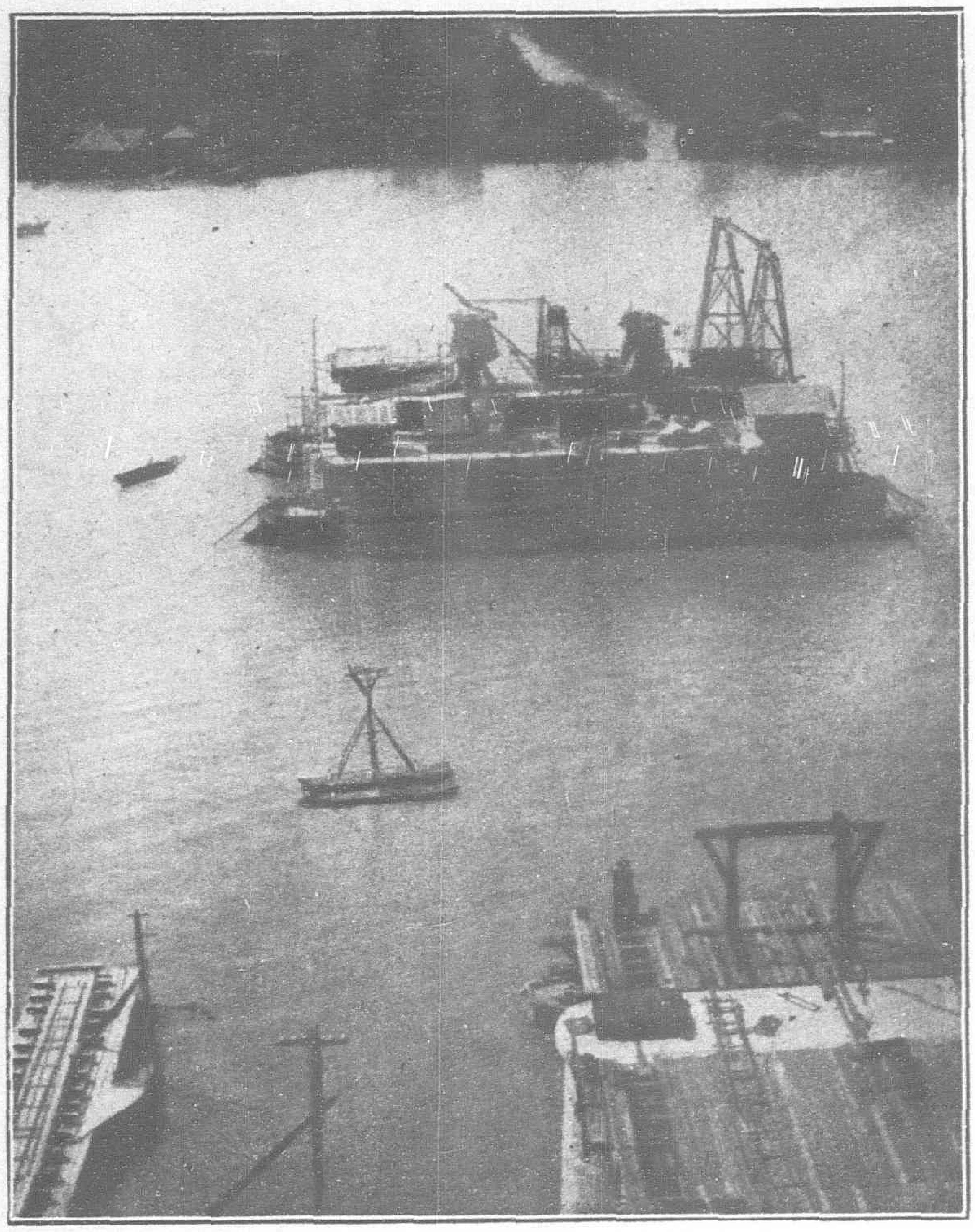


With a total area of about 200,000 square miles Siam extends over fifteen degrees of latitude, her northernmost point being in latitude 20½° North. The climate is tropical. By far the greater portion of her territory lies north of the twelfth parallel, the remainder comprising only a long and narrow strip of the Malayan peninsula which contracts at times to a width of less than twenty miles. This strip consists of a coastal plain broken at intervals by spurs from the mountain ridge which forms the back bone of the peninsula. North of the twelfth parallel the country is composed of an extensive plain, the valley of the River Menam and its many tributaries, which is bordered by mountains. In the north these become the dominating feature and reach a height of 8,450 feet. At the maximum point the width of this northern section is about 480 miles. Siam has as its neighbors French Indo-China, British Malaya and Burma, while its coasts border the Gulf of Siam and the Bay of Bengal for a distance of 1,300 miles. The population totals 9,500,000, averaging about forty-eight per square mile. This average is by no means evenly maintained throughout the country, an especial concentration occurring in the capital city and district of Bangkok, located on the Menam about twenty-five miles from its mouth. The city alone (population 570,000) includes six per cent. of the people of the country, and forms the center of the national life and trade, the second city of the kingdom, Chieng Mai, having but 35,000 inhabitants. The country districts are in general sparsely populated, and the passenger traffic, though forming an important portion of the work of the railways, does not reach in Siam the density occurring in India and the Netherlands Indies.

The most important product and export of Siam is rice, the cultivation of which is practised in almost every portion of the country. The plant is grown to the best advantage in the river plains, in particular that of the Menam, and, while the transport of the grain is principally by water, the annual movement of paddy by rail exceeds 200,000 tons and comprises more than one fourth of the total tonnage offering. Other important exports are timber (especially teak), cattle and hogs, fish and forest produce. Of these the item of cattle and hogs is of chief importance to the Railways, as timber, also, is mostly carried by water. Imports include practically all varieties of manufactured goods, in particular, cotton cloth, silk, food products, metals and machinery, and move to the interior largely by rail, producing an important volume of package freight.

Some ninety per cent. of the exports and imports of the country pass through the Port of Bangkok, which is consequently the focus of the freight operations of the Railways. The ports of Southern Siam, such as Nakon Sritamaraj, Singora and

Kantang, all of which have rail connection, are assuming increasing importance, however, particularly as regards the export of cattle; and with the further development of the Peninsula will probably handle the major portion of the trade requirements of that territory.



Rama VI Bridge Under Construction

The total freight traffic for the year 1923-24 (the Siamese year commences on April 1st) amounted to 975,927 metric tons, and, in addition, 211,421 head of live stock were handled with a resulting revenue of 6,452,687 ticals (one tical= $.44). In the same year some 5,050,000 passengers were carried (of whom 4,933,000 travelled third class), the income from this source amounting to 5,957,393 ticals. In this year total railway revenues from transportation operations thus reached the figure of 12,410,080 ticals.

The first step toward the creation of a railway system in Siam was taken in 1887 with the commencement of surveys for a line from Bangkok to Chieng San in the extreme northern part of the country. These preliminaries did not immediately result in construction, but political considerations soon led to activity in another direction. Tension with the French on the eastern frontier and the fear that the trade of East Siam might be diverted to Saigon, led to a decision to strengthen the position of Bangkok by a railway to Korat (Km. 264), and work was commenced under contract in 1892. The successful bidder was British, while the Royal Railway Department, organized to present the Government in dealing with the contractor, fell into the hands of German interests which had been unsuccessful bidders for the work. Much friction naturally resulted, and in 1896 the contract was cancelled, the Government taking over the work of construction for its own account. In 1897 the first section of seventy-three kilometres was opened for traffic, and the remainder of the line was completed and placed in service in 1900. This division is now designated the Northeastern Line.

Before the completion of the Northeastern Line the project for a line to Northern Siam, which had at first been under consideration was revived making use of the Northeastern Line as far as Ban Phaji Junction, ninety kilometers north of Bangkok. Railhead reached Den Jaya (Km. 533) in 1909, but here the economic limit of the line appeared at the time to be reached, since further construction in the mountainous region of North Siam promised to be costly and the prospective traffic was quite insufficient to make the work remunerative. Operations were suspended for a period of three years, but in 1912 construction was resumed with an ultimte terminus at Chieng Mai (Km. 750) in view. This work was uncompleted when Siam entered the World War (July 22, 1917), the difficulty of obtaining material under war conditions greatly delaying its progress.

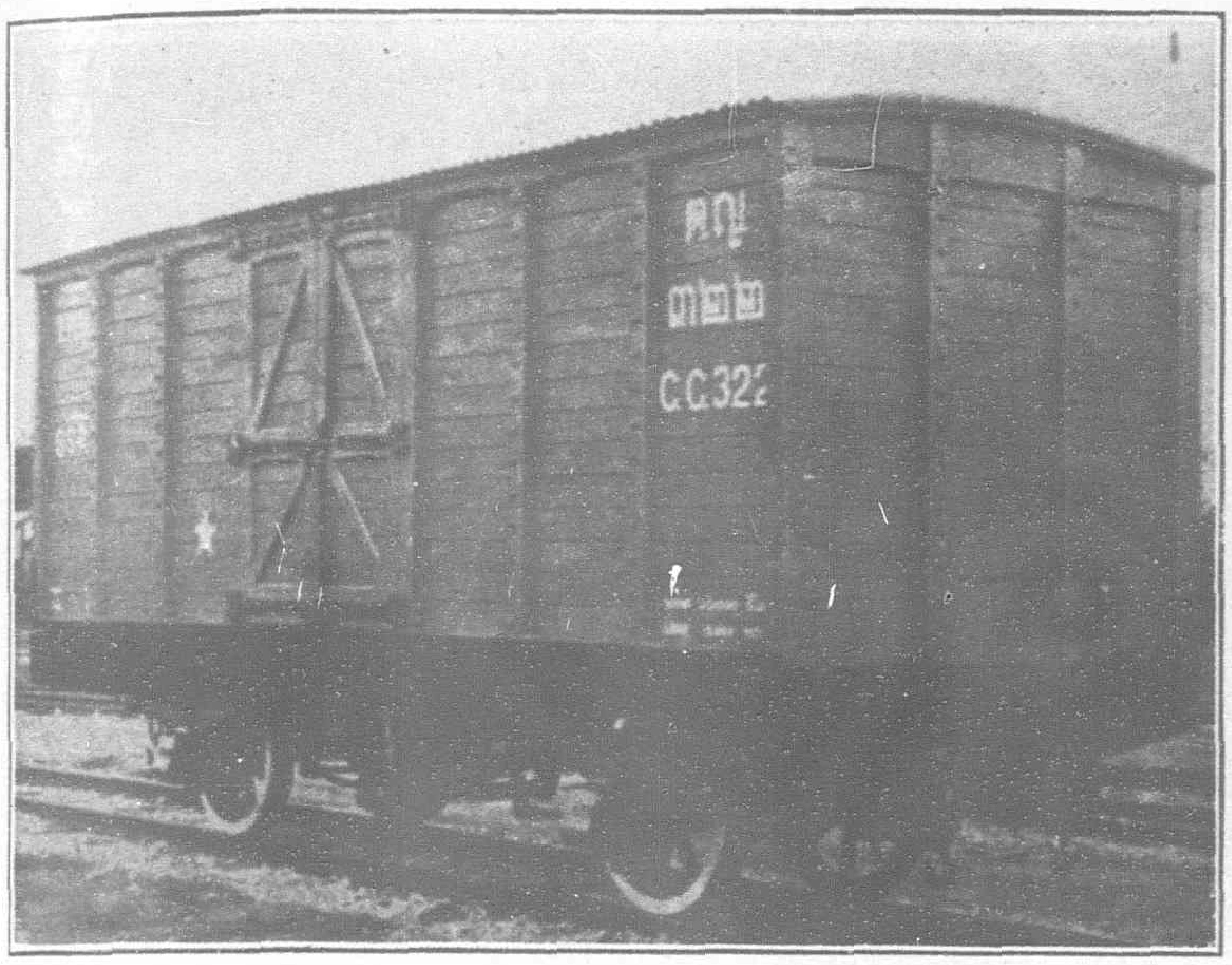
Hua Lampong Terminal, Bangkok

A third line leading directly from Bangkok to Petrieu (Km. 63) and designated the Eastern Line was completed and placed in service in 1908.

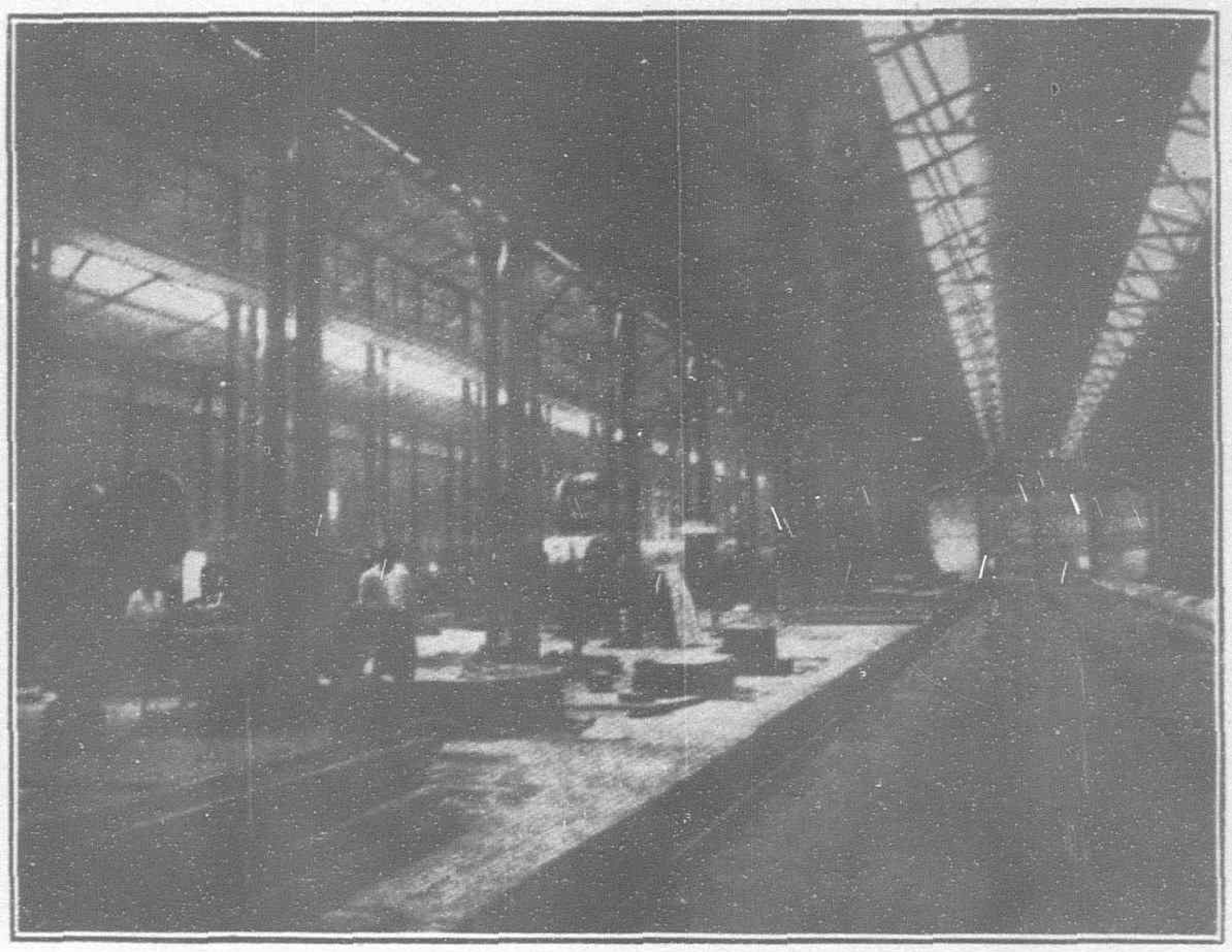
On the west bank of the Menam River work was commenced as early as 1900, and in 1903 a road, known as the Southern Line, was opened to traffic as far as Petchaburi (Km. 152). The eventual connection of this line with the railroads of British Malaya was even then in mind, and its gauge was fixed at one metre to harmonize with the Malayan system.

All the work described above was executed under the original Royal Railway Department which, as has been seen, was under German influence. The European standard gauge of 1 m. 435 was employed (except for the Southern Line), and rolling stock, while light, closely followed European models. In 1909 British influence asserted itself, and a loan of £4,000,000 was made to Siam by the Government of British Malaya for the purpose of extending the Southern Line to a junction with the Malayan railways. The circumstances of this loan made it necessary that the construction and operation of the extended Southern Line be under British auspices; and, as the control of the lines east of the Menam was entirely German, a second Railway Department was organized to handle the operations on the west bank and was officered by British engineers. The work was carried on with activities, and in 1917 the line was opened to Padan Besar (Km. 974) on the Kedah border, where junction was made with the Malayan railways; while branches to Kantang, Singora and Nakon Sritamaraj totalling 158 kilometers were also placed in service. With the completion of this work free interchange of rolling stock with the Malayan lines was commenced, and through service between Singapore and Bangkok Noi, a distance of about 1,900 kilometers, became possible.

At this point the entrance of Siam into the World War on the side of the Allies (July 22, 1917) led to a very advantageous reorganization of the clumsy two-department system then obtaining. Upon the declaration of war all Germans in the country were interned as enemies, and the lines east of the Menam, thus left without directing personnel, were combined with the Southern Line into a unified Railway Department. At the head of this department was placed as Commissioner-General H. R. H. Prince Purachatra, a brother of the King and a man of unsual capacity, energy and vision, well fitted by natural aptitude, education and experience for the difficult work



Box Car, Equipped with Vacuum and Lever-Operated Hand Brake



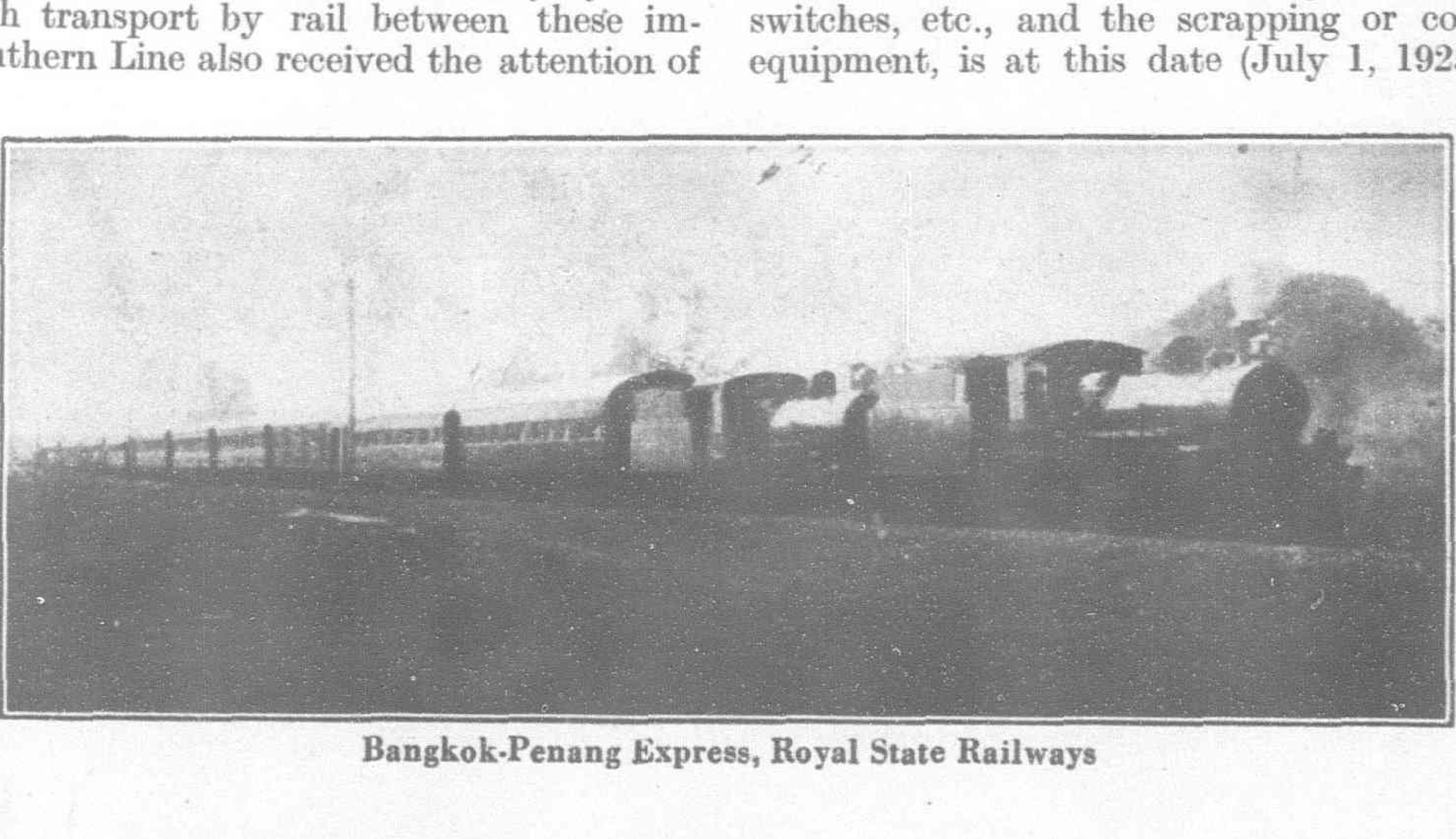
Locomotive Erecting Shop, Makasan, Bangkok

he has now to under-take. What might be termed the second period of Siamese railway development dates from this reorganization, and has been marked by definite progress on all the projects previously under way, while new and far-reaching plans for futher expansion have been taken in hand.

The extension of the Northern Lines, already under construction, was pushed in the face of many natural obstacles, perhaps the most formidable of which is the Khun Tal Tunnel (1,360 meters in length), and at the end of 1921 traffic to Cheng Mai (Km. 750), the present terminus of the line, was commenced. The ordinary passenger and freight service then introduced was supplemented in November, 1922, by a through express train twice a week, carrying sleeping and dining cars between Bangkok and Chieng Mai and covering the distance in 25½ hours.

In 1921 further extensions of the North-eastern and Eastern Lines were projected. The ultimate terminus of the former section was placed at Ubel Rajdhani (Km. 575), a town some 100 kilometres from the French border and having water connection with the Mekong River, while an important branch was planned to leave the line at Korat ((Km. 264) and proceed in a northeasterly direction to Khorn Kan (Km. 452). These additional lines are expected to contribute greatly to the development of the hitherto backward but potentially valuable region of Eastern Siam. At the date of writing (July 1, 1925), the Ubel line was opened to traffic as far as Buriram (Km. 376), and earthwork on the Khorn Kan branch had been commenced. Meanwhile an extension of the Eastern Line to Aranya Pradesa (Km. 254) at the French border was also under way, and at the date mentioned was in service as far as Krabin (Km. 151). From a commercial standpoint the country through which this line passes is not of so much importance; but, by connection with the road system of French Indo-China, facilities for land traffic between Saigon and Bangkok are provided, and without doubt future extensions of the French Railway systems will make possible through transport by rail between these important capitals. The Southern Line also received the attention of the new Commissioner General, the existing road being supplemented by a branch from Haad Yai Junction (Km. 928) to Sungei Golok (Km. 1142) at the Kelantan border, where connection is made with the Eastern Branch of the Malayan railways. Traffic to Singapore over this route is at present not possible, but it is expected that the end of 1927 will see the completion of construction through the protected states of Kelantan and Pahang and the opening of through communication by this line. The Siamese branch to Sungei Golok has been in service since 1921, and has been of much assistance to the construction work through the British territories. A valuable addition to the service afforded by the Southern Line was the institution in 1922 of express trains with through dining and sleeping cars between Bangkok Noi and Penang, the journey of over 1,100 kilometers being accomplished in thirty-four hours. This service, at first running once a week only, has been increased to two trains per week and has proved very popular, reducing the time of transit between Bangkok and Europe by a full week as compared with the all-water route via Singapore.

Two other steps of much import to the Railways have been taken under the present administration. The junction of the 1,000 mm. gauge Southern Line with the Malayen railways of similar gauge at Padang Besar and Sungei Golok has been noted, and the future will probably see the establishment of connection with the Burmese railways, also of 1,000 mm. gauge, the uniting link springing from the Siamese Southern Line at Prachuab Kirikan (Km. 302), less than thirty kilometers from the Burmese frontier. It may further be expected that a French railway will eventually join the Eastern Line Extension at Aranya Pradesa, the French gauge being also 1,000 mm. The fact that all contiguous countries have thus standardized the meter gauge, together with the difficulties of administration and the inability to interchange equipment consequent upon the employment of varying gauges, determined the Siamese authorities to adopt this standard also; and in 1921 it was announced that all existing lines east of the Menam River would be altered from 1 m. 435 to one meter, and that the projected extensions of these lines would be one meter. The execution of this daring but wise decision, involving the laying of a third rail over 1,008 kilometers of main line, together with all attendant side lines, switches, etc., and the scrapping or conversion of all 1 m. 435 equipment, is at this date (July 1, 1925), nearly complete. The laying of the third rail will be finished in 1926, and a purchasing program for one meter equipment, extending over a considerable period of time, has made notable progress. Meter gauge trains exclusively have been used on the Eastern Line since September, 1921, while 1925 will probably see the last of the 1 m. 435 gauge on the Northeastern Line as well.

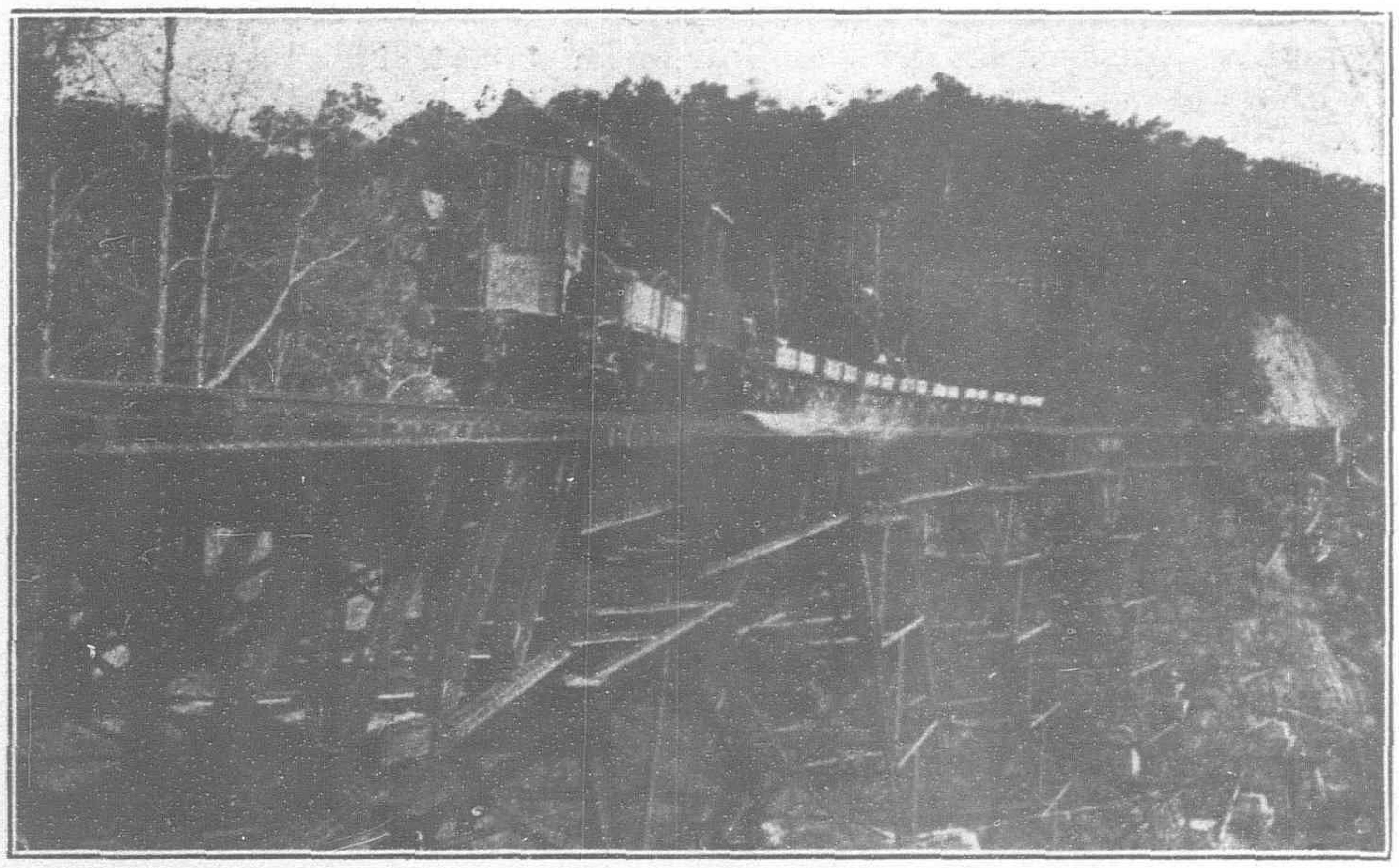


Bangkok-Penang Express, Royal State Railways

A natural outcome of the standardization of gauge with its resulting interchangeability of equipment is the desire for a physical connection between the lines east and west of the Menam River, both to permit through traffic and to realize the operating economies possible with a fully unified system. To meet this need a project for bridging the river about eight kilometers north of Bangkok was taken in hand in 1922, the structure being designed to carry a highway and footpaths in addition to the railway. The construction of the bridge, performed under contract, has met with much delay, but it is hoped that this final link in the Siamese railway system will be complete by the end of 1926. With the consequent disappearance of the Bangkok Noi terminal, all trains will enter the excellent Hua Lampong station in the heart of Bangkok, and through traffic between all parts of the Siamese and British Malayan systems, together with increased availability of the Central Workshops at Makasan on the outskirts of Bangkok, will also follow. The resulting advantages and economies in the management and operation of the Railways are certain to be of a most important kind.

Viaduct at Pang Puei, Northern Line

The time is thus not far distant when Siam will be in the possession of a unified meter gauge railway system totalling about 3,000 kilometers of main track reaching all important cities of the Kingdom and possessing established connections at the Malay border, permitting through traffic between Chieng Mai and Singapore, a distance of about 2,650 kilometers. Other important connections await only the cooperation of neighboring countries, as the Siamese rail heads within two years will stand at the French and Burmese borders.

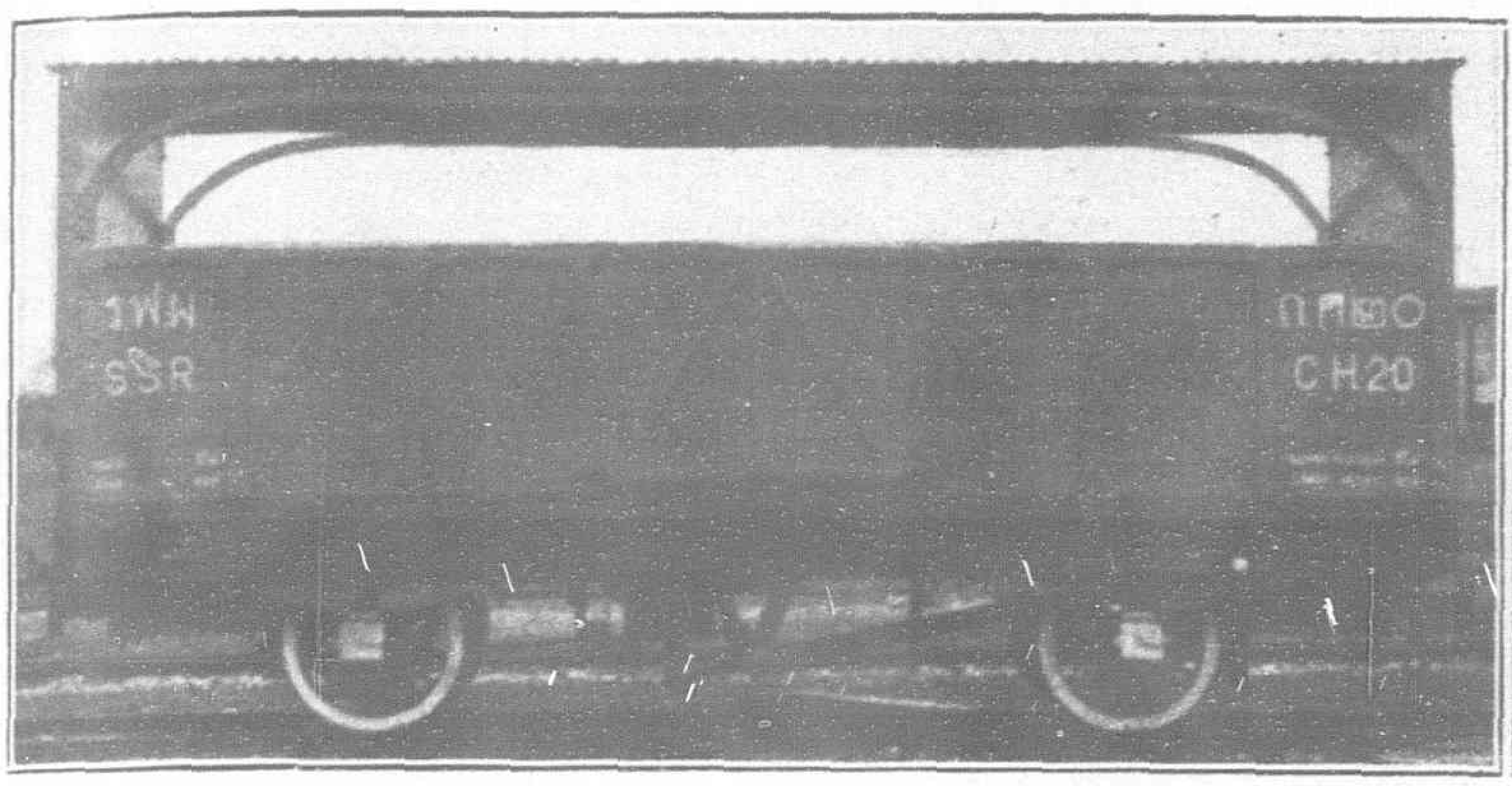


Viaduct at Khun Tal, Northern Line

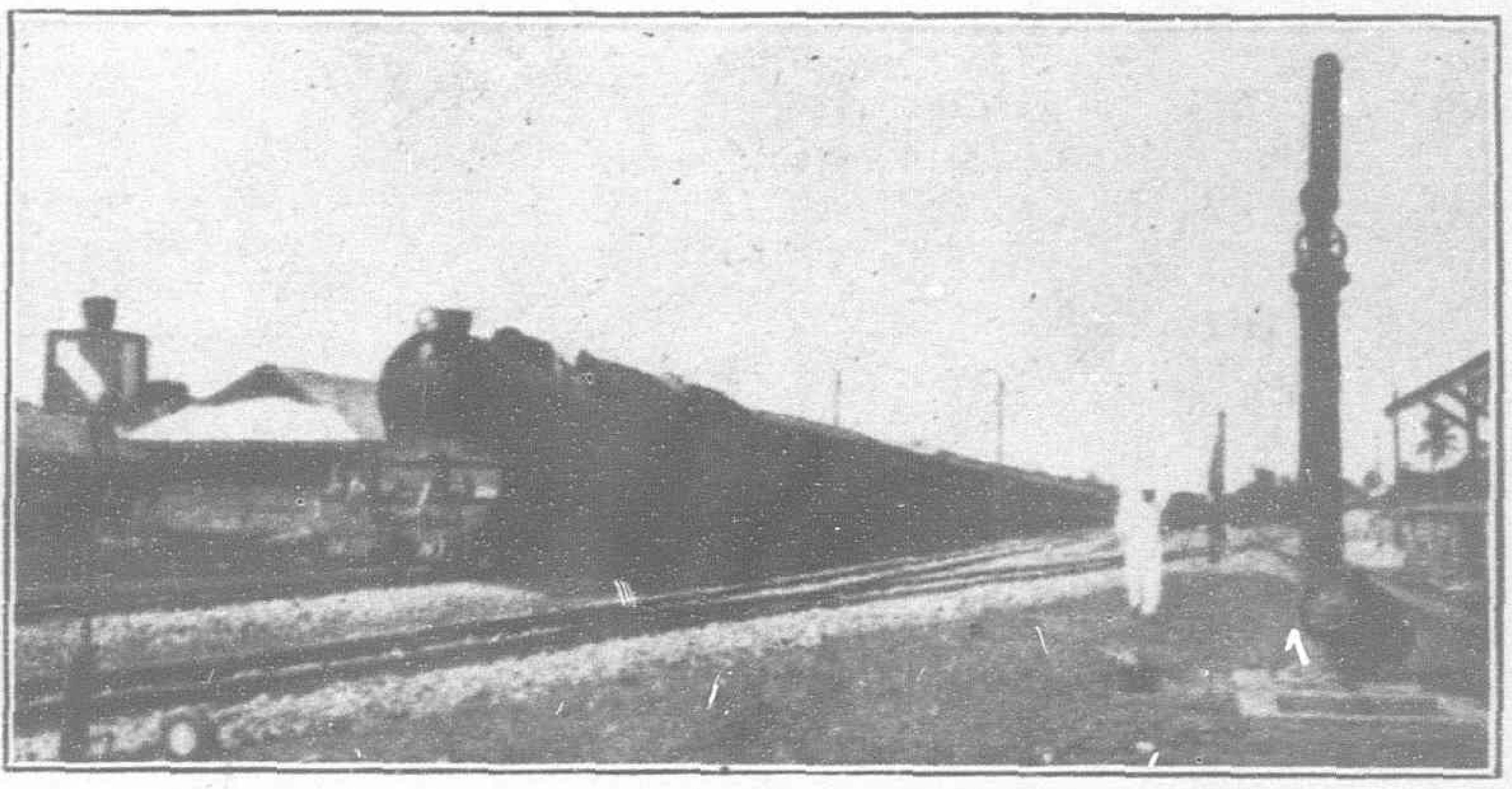
With the conversion of gauge the majority of the Siamese locomotives of 1 m. 435 gauge will be consigned to the scrap heap and the greater part of the older power of the system will be included in this operation. The meter gauge locomotives of recent or modern construction are composed of 42 engines of the 4-6-0 type, purchased in England at various times between 1913 and 1921; 4 Pacifics and 10 Mikados built in 1923. The Pacifics and six of the Mikados were built by the Batignolles Co. of France; two Mikados were built by Nasmyth Wilson Company of Great Britain and two Mikados by The Baldwin Locomotive Works. As a result of extensive tests, a further purchase was made in 1925 of four Pacifics and four Mikados of designs similar to the Baldwin Mikados built in 1923, except that the new engines are provided with three cylinders to secure the most uniform torque and maximum tractive power permissible on the Siamese lines. These eight 3-cylinder locomotives were built by The Baldwin Locomotive Works and shipped direct from Eddystone wharf to Bangkok per s.s. *Moorish Prince*.

The Railways are burning a good grade of hard wood having a calorific value of 6,500 B.T.U. per pound. This is good fuel and with two firemen on each locomotive the firing is entirely adequate. The cost of the wood is reasonable, although as the supplies near the railroad lines become exhausted and more distant forests are drawn upon, this expense must inevitably rise. Siam has deposits of lignite very similar to those occurring in the central and western portions of the United States, which may be satisfactorily turned to locomotive use. In the case of wood or lignite, long Baldwin experience in designing fireboxes for the consumption of low-grade fuels is proving of value.

The principal shops of the Railways are located at Makasan, a suburb of Bangkok, the works lying about five kilometers from the Bangkok terminal. The various shops cover, at the date of writing, about 24,000 square yards; and, in addition to locomotive and car repairs, handle some automobile and rail motor work. Though locomotives have not been built, both car underframes and car bodies are fabricated, the woodworking shop being unusually well equipped. Trucks for these cars are obtained from Europe. In preparation for the completion of the Rama VI Bridge, after which time the heavy repairs of the entire system will be centered at Makasan, a new and commodious car shop has lately been put into service, while a large and well-arranged locomotive shop is also planned, a portion of its equipment being already on order. The works are close to both the geographical and the traffic center of the system as well as to the principal port of entry, while the labor market is the best in the country. The Railways maintain their own wharf on the Menam River below Bangkok, and this is united to Makasan by direct rail line providing prompt transport of imported goods.



High Side Covered Car, Equipped with Vacuum and Lever-Operated Hand Brake



Batignolles Pacific Type Hauling Bangkok-Penang Express

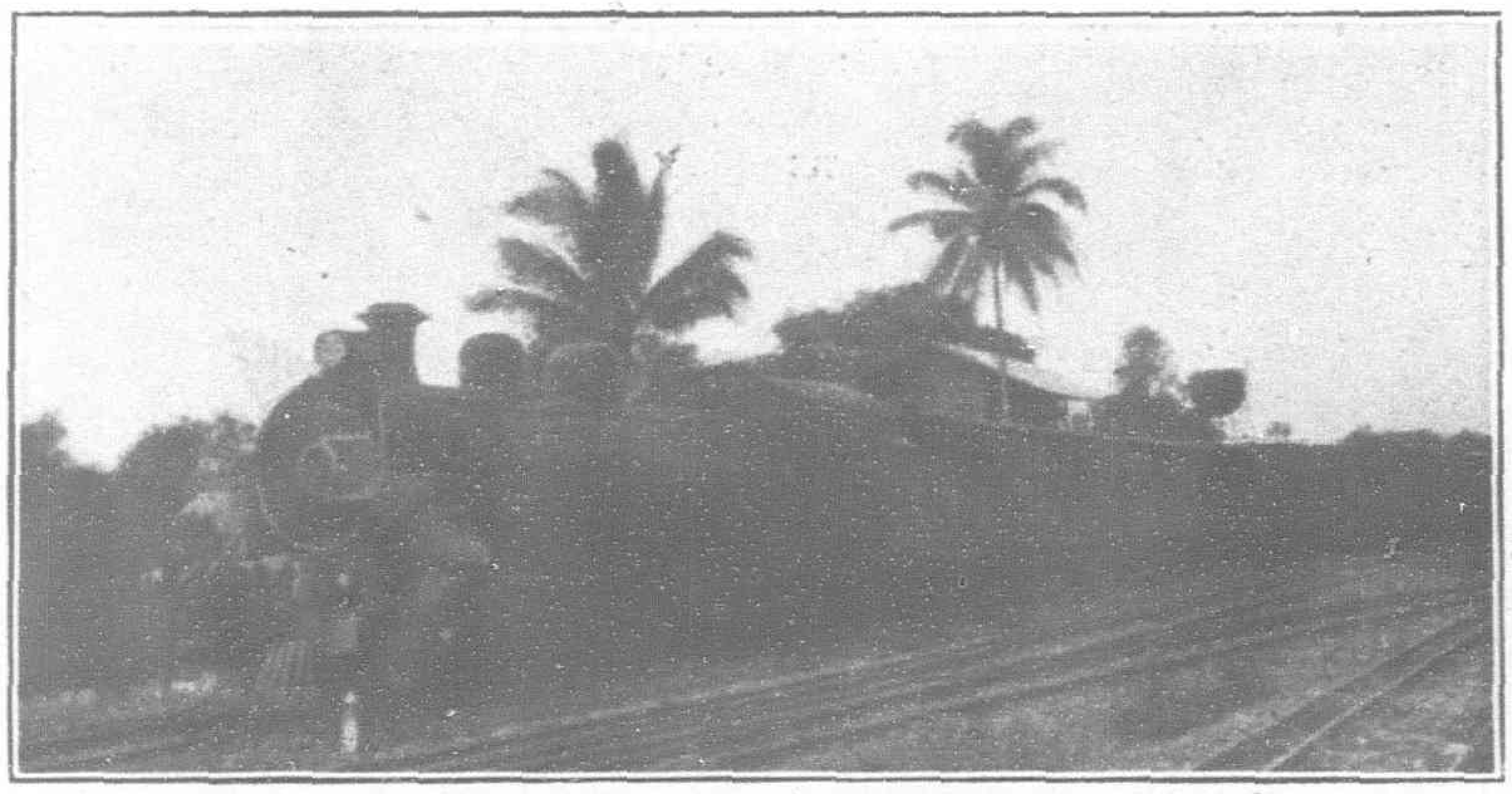
When working to capacity, the Makasan shops employ about 1,000 workmen, and can handle heavy repairs to some sixty locomotives and 1,300 cars per year in addition to the construction of new cars which is constantly in progress.

The absence of physical connection between the Southern Line and the remainder of the system has necessitated the establishment at Bangkok Noi of shop facilities sufficient to care for the periodical repair of the Southern Line rolling stock. These shops are limited in extent, all except routine work being sent by water to Makasan, and upon the completion of the Rama VI Bridge will practically disappear. None of the outlying stations are provided with more than ordinary running shed facilities for repair work, all heavy items being forwarded to Bangkok.

As of April 1, 1925, there were in operation 2,580 kilometers of main line track, and extensions authorized and under construction amounted to an additional 480 kilometers. The equipment on hand for the operation of these lines included the following :

	Gauge	
Locomotives	1435 mm.	60
,,	100 mm.	76
Freight cars	1435 mm.	874
,, ,,	1000 mm.	1469
Passenger cars	1435 mm.	164
,, ,,	1000 mm.	177

The total capital expenditure upon line and equipment to April 1, 1924, amounted to 163,700,000 ticals (1 tical = $.44). At this time the operating personnel of all classes totalled about 13,300, of whom but forty were Europeans. The great majority of the remainder were Siamese, with a sprinkling of Chinese, British Indians and Malays.



Baldwin Mikado in Service

Total gross earnings for the Siamese year 2466 (April 1, 1923-March 31, 1924) amounted to 12,686,612 ticals, with operating expenses of 6,090,910 ticals, the resulting operating ratio being 48 per cent. After adequate allowance for depreciation, the net income represents a return of 4.03 per cent. on the capital investment. The greater part of this income is derived from the lines east of the Menam River, as the lack of sufficient feeding area and the necessity of meeting at almost all points the competition of water transport materially reduce the productiveness of the Southern Line.

The period of development of the Siamese Railways is now well advanced. The completion of the Rama VI Bridge and of the conversion of gauge are the finishing acts of the work of consolidation begun in 1917 with the institution of the present unified Railway Department. The extensions under way will practically complete Siam's contribution to the railway inter-connection of Southeastern Asia, as they make immediately practicable a junction with the system of French Indo-China at one point and place a second railhead within striking distance of that border, while the Siamese portion of a Burmese connection is a small task readily accomplished whenever required. The period to follow will probably be characterized by improvements in operating technique rather than by additional extensions, while the development of the country served will bring increased business to the Railways and still further make clear the wisdom of Siam's investment in her railway system.

New Mail Steamer for Dutch East Indies Trade

On March 13 De Schelde Royal Shipbuilding Company of Flushing launched the twin-screw motorship *Van Heutsz*, intended for a combined passenger, mail and cargo service of the Koninklijke Paketvaar Maatschappij, in the Netherlands East Indies.

The vessel has been built to the highest class of the Bureau Veritas, her length overall being 404-ft. 6-in., between perpendiculars 390-ft., extreme breadth 52-ft., and depth moulded to upper deck 27-ft. 6-in. Her gross register tonnage will be 4,650 and on a mean loaded draft of 20-ft. she will have a mean speed at sea of 13¼ knots.

She has seven watertight bulkheads, dividing the space below the upper deck into four cargo holds, motor room feul bunker and fore and aft peak tanks. The double bottom is four feet high in way of engine room and 3-ft. 5-in. in other parts, extending practically the whole length of the vessel, is divided into 6 watertight tanks, and serves for the carriage of fresh and engine cooling water and lubricating oil supply.

Accommodation will be provided for 16 first class and 30 second class passengers, in addition to provision being made for the carriage of a large number of native 'tween deck passengers. The crew will number 105 men all told.

The propelling machinery comprises two Schelde-Sulzer two-cycle Diesel engines of six cylinders, each developing 1,700 shaft h.p. at about 100 revolutions per minute, and each fitted with its own air pumps for scavenging and combustion air. Two dynamos of 280 k.w. capacity each, driven by four cylinder two-cycle Sulzer Diesel engines, are installed in the engine room to supply current to electric auxiliaries and lighting system. Engine room auxiliaries are driven by electricity, and include compressor, ballast pump, two sanitary pumps, auxiliary santiary pump, two fresh water pumps, and two oil cleaners. A smaller compressorless Diesel engine is fitted to drive auxiliary dynamo supplying current in port and emergency air compressor. Electrically driven refrigerating machinery is installed in tunnel recess.

It is interesting to note that on the vacated berth the keel is to be laid for the twin-screw passenger motorship *Sibijak*, of 530-ft. in length, 62½-ft. in breadth, and of 38-ft. depth, which is to be built to the order of the Rotterdam Lloyd, for trade in their Far Eastern service.

Coal in the Philippines*

By Leopoldo A. Faustino

COAL mining continues to be one of the most important of the mineral industries, the value of the coal produced in 1923 being 874,441 pesos, or a little over 13 per cent. of the total value of the mineral output for that year. With the exception of 1920, which represents the abnormal postwar production, the annual output of the coal mines during the last three years has never been exceeded since coal mining began. The total production for 1921, 1922, and 1923 is greater by 12,551 tons than for the four previous years, and exceeds by 73 tons the total coal production of the Philippines up to and including 1912. It will be remembered that in 1912 the coal-mining industry suffered a setback and that from 1913 to 1916 there was no commercial production. The present development of the industry began in 1917. The peak production of 1920 will probably not be exceeded for some years to come—certainly not until more development work is done on the producing mines and more attention is paid to promising properties in undeveloped districts.

The present production comes from the three principal coal fields: namely, Cebu; Batan Island, Albay; and Malangas, Mindanao. Other known fields such as Polillo and Sugud, Sorsogon, have not yet contributed their share to the total coal production and probably will not make any contribution for some years to come, or until the price of coal increases sufficiently to make mining in these fields commercially profitable. As the cost of transportation is an important item in the coal-mining industry, it is hoped that the problem may be partly solved with simultaneous development of two or three localities in one district or the discovery of new fields close to some means of easy communication with established railroads. In order that this idea may be given impetus, and for ready reference by those engaged in coal prospecting or the development of new and old fields, the following prospecting or the development of new and old fields, the following list of provinces known or reported to contain coal is given:

Abra.
Agusan.
Albay.
Bohol.
Bulacan.
Cagayan.
Camarines Sur.
Capiz.
Cebu.
Davao.
Iloilo.
Lanao.
La Union.
Leyte.
Masbate.
Mindoro.
Mountain.
Nueva Ecija.
Nueva Vizcaya.
Occidental Negros.
Oriental Negros.
Rizal.
Samar.
Sorsogon.
Surigao.
Tayabas.
Zambales.
Zamboanga.

Agusan and Bohol are included in the above list, although the Division of Geology and Mines has only been shown samples supposed to have been taken from those provinces. No difinite locality is given. Since Becker's report it has become known that Leyte possesses coal. However, it was only recently that a sample from that locality was sent to the Bureau of Science for identification. This sample is said to have been found in Sitio Bagahupi, Barrio of Uban, Municipality of Babatngon.

The following provinces are not known to contain any coal, but careful search in some of them may reveal deposits of importance:

Antique.
Batan.
Batanes.
Batangas.
Bukidnon.
Camarines Norte.
Cavite.
Cotabato.
Ilocos Norte.
Ilocos Sur.
Isabela.
Laguna.
Marinduque.
Misamis.
Palawan.
Pampanga.
Pangasinan.
Romblon.
Sulu.
Tarlac.

Review of Coal Mining in 1921, 1922, and 1923

Of the three coal fields (Cebu, Batan, and Malangas) Cebu has maintained the steadiest output and, with the exception of 1921, when Batan produced about 600 tons more, has led the other two districts in total production. In 1922 Batan was a poor third, but in 1923 that field showed signs of healthy development, and 1924 may find it competing for first place.

Cebu.—In 1921 Cebu had fourteen coal operators producing coal in greater or less quantities. Among these are included holders of coal revocable permits or the coal prospectors' license issued by the Bureau of Lands. These have small workings and use rather primitive methods of mining. They correspond to "wagon mines," "snowbirds," and "country banks" of the United States. In 1920, when coal prices were high, a large number of coal revocable permits were issued. They contributed then no small amount to the total production. In 1921 these small workings produced only about 11 per cent. of the coal production of Cebu. The other 89 per cent. came from the mines of the National Coal Company at Licos, the Danao Coal Mining Syndicate at Camansi, and the Uling-Naga Coal Company at Uling. In 1922 the small workings, or "paquiao," as they are oftentimes referred to, produced only 149 tons of the total 20,077 tons for the whole Cebu field. In 1923 the number of coal operators was reduced to five, and with one exception all workings under coal revocable permits closed down. Practically the whole production came from the mines of the National Coal Company, the Uling-Naga Coal Company, the Danao Coal Mining Syndicate, and the Cebu Coal Mines, Incorporated.

The bulk of the production of the National Coal Company at Licos came from its No. 8 slope, which has been driven approximately midway between the north and south boundaries of the property. It will be remembered that four seams have been recognized in this property; namely, the Carmen, the Esperanza, the Abella, and the Enriqueta. These are named from west to east; that is, from lowest to highest. All the seams strike in the same general direction, north 23° east, and dip about 40° to the southeast. A fifth seam, the Pilarica, recorded by Spanish engineers and supposed to lie about 40 meters east of the Enriqueta, has never been met. The No. 8 slope cuts the Esperanza and the Abella seams, but the main haulageway at the foot of the slope has been driven on the strike of the Abella seam. Crosscuts have been made to the Esperanza, the Carmen, and the Enriqueta seams. From these crosscuts tunnels have been driven on the strike of the Esperanza and the Carmen. Crosscut No. 1 East, driven from the Abella to find the Enriqueta, struck a badly disturbed area and no recoverable coal, and the Enriqueta tunnel is at this writing in barren area. Crosscut No. 2 East from the Abella tunnel, driven about 350 meters from the foot of the slope, also failed to find the Enriqueta. Late in 1923 the main haulageway in the Abella struck the east and west fault, which is about 500 meters north of slope No. 8 and has been known since Spanish times as the general fault. After driving through 70 meters of rock the coal has been met again. The present plans of the National Coal Company are not known. Search for the Enriqueta seam has been stopped temporarily. The main haulageway continues on the Abella, and slopes are being driven to lower levels. It is intimated that diamond drilling may be resorted to in order to help locate the Enriqueta and to determine the exact nature of the other coal seams present in the area.

About 4 kilometers north of Mount Licos are the mines and workings of the Danao Coal Mining Syndicate at Camansi. This company changed hands in 1922, and the new owners have planned extensive development work. South of Danao River and near the present terminal of the tramway five seams are recognized. These seams have been known since Spanish times and, while they strike in the same general direction as the Licos seams (that is, north 20° east) and dip to the southeast, the two districts have never been correlated. From west to east these five seams are the Carmen, No. 3, No. 2, No. 5, and the San Luis. Mr. Florentino M. Canga, who has been connected with coal mining in Cebu since the early days of the Spanish Inspection General de Minas, ventures the opinion that the Camansi No. 2 can be correlated with the Licos Abella, No. 3 with the Esperanza, and Carmen with the Carmen. The basis of the tentative correlation is the presence of a fire clay floor in both of the Carmen seams, and the distance between No.

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*Issued by Division of Geology and Mining Bureau of Science, Philippine Islands.

2 and No. 3 and between Abella and Esperanza, which is 14 meters. The roof of Esperanza contains fossils, and so does the roof of Camansi No 2. A hurried examination of the fossils seems to point to the corectness of the correlation, but a detailed study of the stratigraphy of the district is necessary to arrive at any definite conclusion.

North of the tram terminal on the other side of Danao River four seams are known, all striking about north 60° west and dipping to the northeast. From west to east these seams are the Santa Barbara, the Inday, the Casila, and the Rosalia. A tunnel has been driven on the strike of the Santa Barbara, and a slope has been started to crosscut the Inday seam.

In the Mount Uling coal district the most important seam is the Dona Margarita seam. This seam has been known since the early days of Spanish occupation and has been the one most eagerly sought. It averages about 3 meters in total thickness. About 1860 a tunnel 647 meters long was driven to strike this seam, and according to the record of the Spanish inspectorate actually reached the large bed. In 1915 another tunnel was driven under the supervision of Wallace E. Pratt, formerly chief of the Division of Mines, and the coal was reached at a distance of 121 meters. A slope was then driven on the dip of the bed and carried to a distance of 98.4 meters, when the old Spanish workings were encountered. In 1920 during my first visit to Cebu I found a tunnel being driven at about the same elevation as the Spanish tunnel of 1860 but directed at right angles to the seam. This tunnel, which is now known as Dona Margarita Tunnel No. 1, has not yet reached the seam on account of several interruptions, but it is now being worked energetically.

There are at least four other seams on the eastern slope of Mount Uling, all dipping in the same general direction as the Dona Margarita seam; namely, 40° to 50° northwest. These seams, averaging about 50 centimeters in thickness and locally known as the coking coals, have been encountered in both the old and the new Dona Margarita tunnels. They have been traced for a distance of approximately 3,000 meters and were at one time the source of the greater part of the production of the holders of coal revocable permits. On the western side of Cebu Island near the town of Toledo on the slopes of Mount Uling are some coal seams which are probably the continuation of the seams that have been opened up on the eastern side of the mountain. Some prospecting has been done here with "paquiao" workings, producing small amounts of coal.

According to J. C. Nichols, who has done considerable prospecting and some development work, there are two commercial seams in this territory. One seam is from 50 to 75 centimeters in thickness while the other seam, which is from 5 to 8 meters below the first one, varies from 1 to 1.4 meters in thickness.

Batan.—During the last three years the main producers of this field were the Liguan Coal Mines, Incorporated, J. E. Barker, Calangage Coal Mining Company, Philippine Coal Mining Company, Albay-Gulf and Pacific Company , and A. U. Betts.

The Liguan Coal Mines, Incorporated, is operating at Liguan on the western end of Batan Island. The United States Army mine, opened up here in 1905, was not much of a success and all work was abandoned in 1910. In July, 1921, the military authorities turned the property over to the Civil Government, who leased it to E. C. Walters on December 15, 1921. N. T. Hashim succeeded E. C. Walters, and the Liguan Coal Mines, Incorporated, was formed to undertake the development of the property. Production began in 1922. At first scows were used in loading coal to ship but with the completion of a modern pier in June, 1922, interisland steamers coaling at Liguan have been able to load at the pier. Five seams are known here, but only four are contributing to the production. The seams are numbered from top to bottom; that is, the highest seam has been named No. 1 and the lowest No. 5. Geologic conditions are very complicated and there has been much faulting and close folding. The coal is of bituminous and subbituminous rank.

On eastern Batan several companies have operated. The Philippine Coal Mining Company produced during the first half of 1921 between 300 and 500 tons a day. About the latter part of 1921 the company went into the hands of receivers, and nothing has since been done on the property. The Albay-Gulf and Pacific Company did some development and produced some coal from the property to the west of the Philippine Coal Mining Company. At the present time A. U. Betts is operating near the barrio of Dapdap and he has driven three tunnels. As many as eight seams have been claimed for eastern Batan, but the greater bulk of the output has been produced from only three seams. The most important of these seams measures 1.7 meters in thickness. The coal beds at the extreme eastern end, which were worked by the Philippine Coal Mining Company, have a gentle dip, but those now being developed by Mr. Betts dip about 30°.

Near the center of the island there has been found the continuation of some of the seams that occur on the east and west ends of the island. J. E. Barker prospected and did some development work, and the Calanaga Coal Mining Company under his supervision produced a good amount of coal in 1923. At least two minable seams are known near Caracaran, and the coal is of bituminous rank.

Malangas.—This field is controlled wholly by the National Coal Company and comprises the workings at Gotas, Butong, Camp Wilmot, and other places.

The workings at Gotas consist of several adits, the most important of which are Adit No. 4, the Water Level, and those above Tunnel No. 14. A great deal of stripping by Subano Moros has been done. Part of the production has been done under contract, and the National Coal Company has directed its efforts to the Water Level tunnel, which has been driven so as to drain Adit No. 4. The coal seams in this area are slightly folded, and igneous intrusions have been encountered in several of the workings. The most important seam measures 1.3 to 1.8 meters in thickness. A great part of the production of the National Coal Company comes from the Gotas area.

The principal opening at Butong is a small shaft, which from present indications would seem to have been sunk at the top of a dome structure of the coal measures. This shaft was built in 1920 and all the main headings have been driven sloping away from the bottom of the shaft. The coal is semianthracite and measures as much as 3.1 meters in thickness. The workings have produced a fairly large amount of coal, but the output does not find a ready market on account of its unsuitability for local use.

The outcrop at Camp Wilmot was discovered about October, 1920. Development work consisted in sinking a small shaft. Some stripping has been done, and "paquiao" or contract work has contributed no small amount to the total production. Production from the Perez outcrop located at Kilometer Nine began in December, 1922, and has since continued consistently, although in small amounts. The Suico outcrop near Dumaguit has produced good coal, but transportation is slow and the production small.

The main transportation system of this coal district is a 12-kilometer railroad from Butong to tidewater of the port of Malangas on Dumanquilas Bay. A flat-topped ridge separates the Gotas field from Butong. The production from the Gotas workings is trammed by hand to the foot of an incline, where it is pulled to the top of the ridge by a hoisting engine. An aërial gravity tramway from the top of the ridge connects with the railroad cars at Butong. Production from "paquiao" or contract workings are hauled on sledges drawn by carabaos. At Malangas ships lie alongside the wharf and are loaded by means of a tipple. A coal bin has been built near the wharf.

Production and Unit of Measurement

Since Act 2719 became effective coal production has been compiled from figures submitted by the different coal operators. As may be seen from Table 1, production for 1923 is greater by 1,010 tons than in 1922, and by 3,317 tons than in 1921. The total coal production of 1923 is only exceeded by that of 1920, when abnormal postwar conditions prevailed. In spite of the seemingly increased production, the local output is still far below the amount consumed every year (see Table1).

The unit of measurement used in this report is the ton of 1,016 kilograms. According to the laws relating to weights and measures the metric system is the official system in the Philippines, but Act 2719 provides taxation on the basis of the ton of 1,016 kilograms. Coal dealers in the Philippines use the ton of 1,016 kilograms, which is the gross, or long, ton (2,240 pounds). Unless the unit is otherwise expressly stated, the word ton as used in this report means the ton of 1,016 kilograms, to which all other figures reported have been reduced; this applies to the tables of imports and exports as well as to other figures.

Reconstructing Kwangtung

THE Department of Reconstruction of the Kwangtung Government is in charge of Mr. Sun Fo, son of Dr. Sun Yat-sen. This department is charged with the task of building and operating roads, railroads and other means of Communications in the Province of Kwangtung. The following data succinctly states the progress made in highway construction and operation in Kwantung.

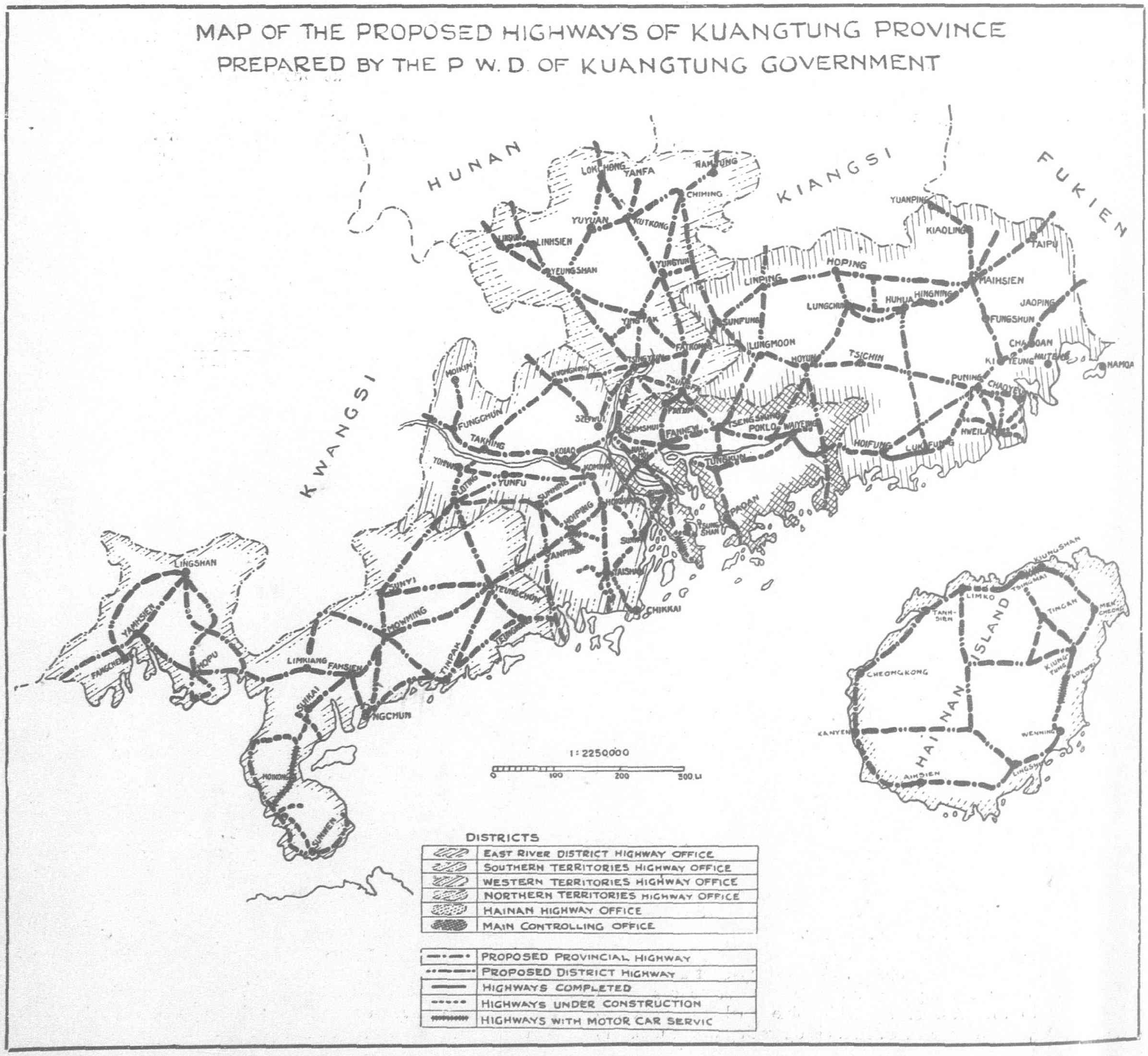
Chung Shan Road (Canton to Whampoa) is almost completed for service. Total length of 10 miles. Width of road-bed 20 feet to be enlarged. A thousand of day laborers divided into section gangs to complete the entire length in 6 months. Total cost is about $60,000 local currency.

Sie Chuen Road (From the Northwestern gate of Canton City to Sie Chuen) will be completed in a few days. Total length of 1½ miles. Width of road-bed 30 feet. Total cost about $5,400 Local currency. First Station of the Kwangtung Yuehan Railway.

REMARKS :—

The average cost of the above roads has been reported by the Kwangtung Highway Department as follows :—

Cost of road-bed per mile..	$3,300.00	For Chung Shan Road
Cost of surveying per mile	85.50	
Cost of management per mile	53.30	
Cost of earthwork per Cheng (10-ft. by 10-ft. by 1-ft.)	1.10	
6-in. Broken Stone pavement with 6-in. Foundation per square foot ..	.16	
6-in. General pavement with 6-in. Foundation per Square foot ..	.10	
6-in. Concrete pavement with 6-in. Foundation per Square foot ..	.50	
Cost of timber bridge 18-ft. wide per L. ft.	50.00	For Chung Shan Road
Cost of Reinforced Concrete Bridge of 24-ft. wide per L. ft.	150.00	



HIGHWAYS COMPLETED :—

Pak-Chack Road in Hoy Ping District with length of 8½ miles.
Wai-Ping Road in Waichow District with length of 2.7 miles.
Lum-Dung Road in Lum Kong District with length of 2 miles.
Sun Ui-Kong Chow in Sun Ui District with length of 4½ miles.

HIGHWAYS UNDER CONSTRUCTION :—

- Toy Shan District
  - From Toy Shan town to different towns within the district five public roads are constructed with total length of 65 miles.
- Hoy Ping District
  - Pu-Sha Road with length of 10½ miles.
- Hoy Hung District
  - Within the district, 110 miles of highways are constructed, It is reported that two-third of the length has been completed.
- Lok Dung District
  - Lok-Kong Road with length of 36½ miles.
- Lock Ui District
  - Kwai-Lung Road with length of 45½ miles, is almost completed.
- Wai Chow District
  - Wai-Choung Road with length of 12 miles.
  - Wai-Young-Hau Ping Road with length of 24 miles.
- Hock Shan District
  - Sun-Hock Road (Kong Moon to Hock Shan) with length of 24 miles.
  - Lung-Chuen Road with length of 24 miles.
- Hoi Fung and Look Fung Districts
  - Look-On Road with length of 42½ miles.
- Chung Shan District
  - Ki-Chuen Road with length of 36 miles.
- Ching Ying District
  - A road with length of 2½ miles is almost completed for service.
- Sun Ui District
  - Ui-Pak Road with length of 48¾ miles.

There are fourteen other highways with length of 515 miles within different districts in the Province will be ready for construction.

Motor-cars are used for passenger service in six districts.

Waichow City wall about 3 miles long and 20 feet wide, will be torn down and a road will be built with a 60 feet road-bed for public service. The total cost for the construction including bridges will be $175,000 Local Currency.

Finest Ship in the Indian Trade

THE finest ship in the Indian trade to-day. No hotel in Great Britain can give the accommodation that is put in these new Anchor liners." Such was the opinion of a highly placed official in the India Office, voiced in the course of an official inspection of the new Anchor Liner *Britannia*, as she lay at the Vittoria Wharf, Birkenhead, loading outwards for her maiden trip.

The Britannia, built by Messrs. Alexander Stephen and Sons, Ltd., Linthouse, Govan, is a single screw steamer fitted with quadruple expansion adapted for oil fuel. She is the third Anchor liner to bear the name of Britannia. The first was built in 1864, and was a vessel of only 2,093 tons, while the latest is a vessel of 8,500 tons. She has a length of 460 feet, breadth 58 feet, and a depth of 34 feet 9 inches, and is designed specially for the Indian trade; she has accommodation for 160 first class passengers on the bridge and upper decks.

The public rooms, with the exception of the dining saloon, are on the promenade deck, and much thought has been devoted to the system of ventilation in order to ensure a constant supply of fresh air even in the hottest weather.

From the entrance hall, which is dignified in its simplicity, access is obtained to the library. Here a quiet sense of comfort is given by the tapestry covered walls and low walnut dado so reminiscent of the English Empire period. Walnut furniture, easy chairs and settees, and a rich carpet, fitting close to the walls add to the atmosphere of quiet repose.

The lounge, which is entered from the main stairway leading from the bridge deck, is designed in a lighter vein, in contrast to the library. One is struck by the absence of stiffness, yet refinement is the keynote of this charming adaptation of the Eighteenth Century English Period. The walls are panelled in polished sycamore of a golden lustre, and to provide relief the mouldings are picked out in silver. Velvety rugs on a polished floor, chairs and settees not too severe, and a piano of excellent tone complete the lounge, which has all the attributes of a ladies' room.

Passing from the lounge through the entrance corridor the smoking room is reached, and here one might be entering an old Eighteenth Century Tavern, so conducive to good fellowship is the atmosphere. The old oak panelling, beams stretched across the ceiling, and a striking red brick fireplace with steel dogs and basket grate are all there to provide the old time surroundings so appropriate as a setting for after-dinner reminisinces.

Close by the smoking room is the deck verandah, which is open to the deck. It is furnished with teak wood tables, comfortable wicker chairs and settees, and is set off by palms and shrubs.

The dining saloon is situated on the upper deck, and spans the full width of the ship. Its system of ventilation combines all the latest improvements and prevents any suggestion of stuffiness; designed in the style of the Georgian period, it is very inviting, and the mahogany furniture is in complete harmony.

Seating accommodation for the vessel's full complement in arranged at small tables for two or four passengers in the café style. As to the cuisine it is sufficient to say that the *Britannia* upholds that degree of excellence which is associated with the Anchor Line and its long experience.

The final note of careful planning is found in the construction of the sleeping accommodation. About 109 passengers can be accommodated on the bridge deck in state rooms with one, two, or three berths; and here it should be added that all the rooms are outside ones, each having a rectangular window fitted with a jalousie shutter. The rooms are spacious and cosily furnished, and cot beds are provided in place of the usual berths. Wash basins and a liberal supply of running water, are fitted in all rooms. Another feature is the number of bath rooms close at hand, equipped with every convenience. On the upper deck 45 passengers can be accommodated in two or three berth state rooms, and in each the same degree of comfort exists. Recreation is also provided for on the *Britannia*. A liberal amount of open deck space is available for exercise, and the promenade deck, entirely free of obstruction, is entirely free for games or dancing.

Bath rooms, a barber's shop, a photographer's dark room, and drying rooms are in close proximity to the state rooms, and are all well appointed, the bath rooms in particular, which are fitted with the latest improvements in the new type of shower bath.

The promenade deck on the *Britannia* is unusually wide for a vessel of her size, and the forward end of the deck can be opened or closed to the weather by means of sliding windows. The after end of the boat deck is known as the "silent" deck, and will be specially reserved for adult passengers, where they can enjoy a quiet "nap."

The *Britannia* has been designed to carry freight as well as passengers, and in cargo accommodation special provision is made for the carriage of locomotives, one of the hatches being large enough to allow a complete engine and tender to be lowered into the hold, which is capable of accommodating four engines and tenders. She has the latest cargo working appliances, her derricks being tested to lift 30, 15 and 10 tons respectively.

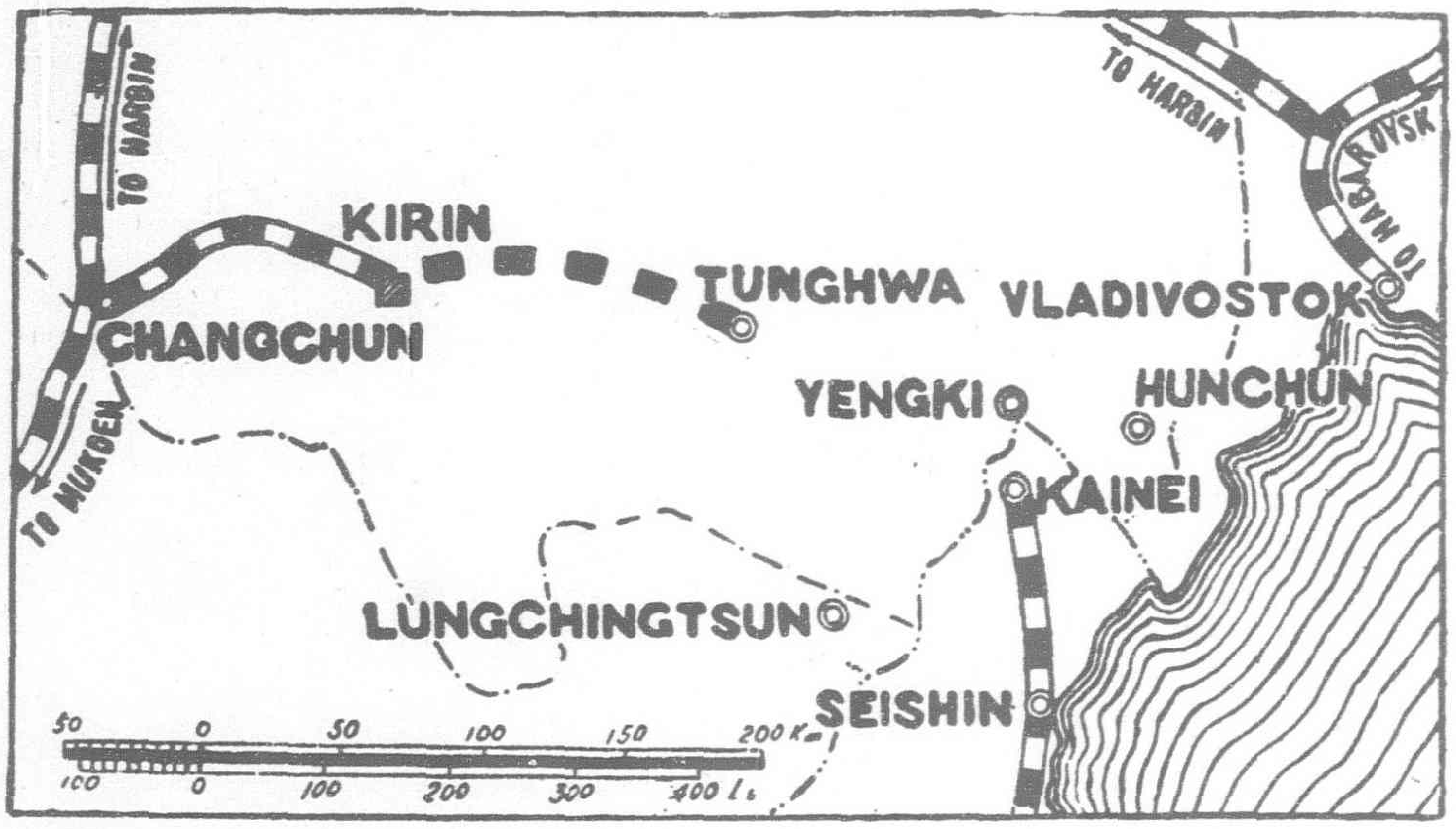
The master and deck and engine room officers are accommodated on the bridge deck, while the carpenter and quartermasters are housed forward, and the native crew aft, where they have their own galley.

It is a matter of general interest that the whole of the decorative scheme of the public rooms of the *Britannia* was designed by Mrs. A. C. F. Henderson, wife of the managing director of the Anchor Line, thus emulating the Hon. Miss Elsie Mackay, daughter of Lord Inchcape, who was responsible for the decorative scheme of the latest P and O liner. Mrs. Henderson's plan has resulted in the provision of the most comfortable public rooms to be found on a modern liner, while the colour effect is most restful and pleasing as the foregoing description will bear out.

Kirin-Tunghua Railway

THE South Manchuria Railway Company is the contractor for the proposed extension of the Changchun-Kirin railway to Tunghua, and surveys are already in progress. Changchun is the northern terminus of the main line of the S.M.R.

An agreement for the construction of the Kirin-Tunghua extension was concluded with the Chinese Government as far back as 1909 by a group of three Japanese banks, the Industrial Bank, the Bank of Chosen, and the Bank of Taiwan. The scheme remained dormant for years, until, in fact, the S.M.R. arranged with the banks mentioned to take over their interests. Subsequently, in 1925, an agreement was reached with the Chinese Government whereby the S.M.R. undertook to construct the line as contractor, the railway to be and remain a part of the Chinese line running from Changchun to Kirin. This contract was repurdiated in the autumn of 1925 when Marshal Chang Tso-lin's influence was withdrawn from the Peking government, but later its legality was established. The contractors estimate the distance of the new line at 130 miles, costing Yen 18,000,000, excluding tunnel work. The contract calls for the completion of the undertaking within two years, but, owing to the mountainous nature of the country, it is doubtful whether it can be completed in that time,



Virgin forests aggregating a thousand square li lie between the two termini. Moreover, according to one investigation only about a fifth of the cultivable land is under cultivation. A Japanese surveyor is authority for the statement that over 200,000 piculs of soya beans and half a million piculs of wheat and other cereals are produced yearly in the four districts, Kirin, Hwatien, Erhmu and Tunghua. The following table shows other principal products of the four districts, and the yearly yield :

District	Tobacco catties	Horses head	Cattle head	Pigs head
Kirin ...	1,300,000	56,000	100,000	1,000,000
Hwatien ...	5,000,000	13,000	4,000	25,000
Erhmu ...	2,700,000	20,000	1,500	15,000
Tunghua ...	500,000	11,000	1,600	18,000

The surveying parties are divided into four sections, each section comprising 15 members under the escort of 25 Chinese soldiers. Section 1 is to look after the 30-mile section between Kirin and Ehomu ; section 2, the 25 mile section between Ehomu and Imaho ; section 3 the 35-mile section between Imaho and Tashaho ; section 4, the 40-mile section between Tashaho and Tunghua.

The most difficult sections from a technical standpoint are the 25-mile section between Ehomu and Imaho and the 30-mile section running from north to south on both sides of the boundary line of Section 3 and Section 4, which are included in the forest zones.

In particular, the railway bridge over the Sungari and the three tunnels to pierce Laoyehling, Chingling, and Weihuling present the pieces of work of greatest importance on the whole line. The Sungari near Kirin is 450 metres wide. Bridge piers are to be constructed at an interval of 48 metres. All other bridges will be wooden.

The total lengths of the three tunnels will be 3,300 metres. All the hills being of granite formation, the excavation work will be very laborious, and in order to save money as well as time, the latest rock drilling machines will be used. For the provisional tunnels, the gradient will be 1-40, to be reduced to 1-80 when the permanent tunnels are excavated.

The Tunghua line has a peculiar advantage over the Taonan-Angangchi Line in that any amount of timber is available along the route, while concrete making materials are found everywhere. This will save considerable hauling and expense. Again, coal is obtainable near Chiaoho, and when brick is made available on the spot, the only building materials to be imported will be cement and rails.

Record Sales made by Dodge Brothers

Retail sales of Dodge Brothers Motor Cars and Graham Brothers Trucks by dealers in the United States in the period from January 2 to April 3, 1926, established another phenomenal record with a total of 70,599 units as compared with 51,318, a gain of 19,281, or 37 per cent. over the same period in 1925.

This high record was made in the face of bad weather conditions which prevailed throughout all sections of the United States during almost the entire period.

Shipments from the factory in the first three calender months of 1926 likewise established a new high mark with a total of 86,351 units as compared with 59,378, a gain of 26,975 or 45 per cent. over the same period in 1925.

Shipments of Dodge Brothers Motor Cars and Graham Brothers Trucks to satisfy the increasing demand of foreign dealers during the month of March reached the highest point ever recorded in the history of Dodge Brothers, Inc., with a gain of 50 per cent. over the corresponding month of 1925. This total was 4,460 compared with 2,972 in March, 1925.

A substantial increase has been made each week in retail sales of Dodge Brothers Motor Cars and Graham Brothers Trucks thus far in 1926, the latest weekly record being established for the period ended April 3, when 9,104 units were sold. This was a gain of 2,574 or 39 per cent. over the best week in 1925, that ended April 11.

The Peipiao Extension of the Chaoyang Branch of the Peking Mukden Railway

By *H. Stringer, B.A., A.M.I.C.E.*

THE total length of this branch is about 70 miles and the construction of the first 33 miles was undertaken in 1921 and opened for construction traffic over many deviations in the late autumn of the same year. This first portion of the line traversed fairly easy country and the construction calls for no particular comment. It is proposed to deal here with the last 37 miles—roughly from the station at Y-hsien to the terminus at Peipiao—which traversed country of some difficulty.

The survey. Grade and curvature limits. As the principal aim of this branch was the development of a colliery whose expected output was put at 6,000 tons a day, and further as a considerable grain traffic was expected to develop, gradients were limited to 1 in 135 and curves to 3½ degrees. The rapidly increasing cost of maintenance in China was also not without its bearing in fixing these limits as low as possible. It was further desired to adopt main line standards as far as possible as much of the expected traffic would pass on to this. Gradient was eased on all curves to 1 in 154 wherever maximum grade occurred. The rails were 60 pound removed from the main line.

Reconnaissance. The country being open and devoid of bush the subtense method of traversing with a fixed offset gave the best results, but a plane table survey was always run concurrently to put in detail and as a check. Ground inclinations were taken from station to station.

The detailed survey for the paper location was contoured at 10 feet intervals throughout, in country where topography demanded it. This was done with great accuracy in the earlier stages of the survey where the ground was very broken. Here the usual tacheometer traverse was run and stations checked by levelling. Contours were located from these stations by level and the positions picked up by tacheometer and plotted in the field. Later as the survey staff was depleted for construction the method of spot levelling was reverted to with tacheometer only. Also was a number of inexperienced students were sent for training in survey work the spot levelling was again extended to include the plotting of contours in the field. In this latter case the levels of each station on the tacheometer traverse were sent back to the plane-table party whose duties combined putting in the topography and also plotting contours. The contours were located by hand level on selected rays radiating from the traverse station distances from this station being fixed by tape. This with the check obtained by the spot levels taken in the ordinary way gave quite good results. The traverse stations were a maximum of 700 feet apart. If it was considered that the connection of the contours taken from each station was not accurately enough represented by sketching on the ground an intermediate station was put in by plane-table.

The scale for reconnaissance work was 2,000 feet to the inch that for paper location 200 feet to the inch. Much of the survey work was carried out in the winter when the ground was frozen to a depth of four feet. Under these conditions an iron peg was used first to make a hole for the wooden pegs, and where final pegging had to be done, only points of intersection and stations at 2,000 feet intervals on long tangents were marked permanently by stones about 8-in. square in section by 3 feet long. Arrows only were used as temporary marks for intermediate stations as these could be driven into the soft six inch layer of soil overlaying the frozen ground.

For the estimation of openings the following table was used as a general guide for culverts but it was widely departed from if inspection of the drainage area was thought to demand it. Complete drainage area plans on a scale of 2,000 feet to the inch were made for all the smaller streams up to about 4,000 acres in extent. The method adopted for drainage area measurement was the subtense traverse.

Size of arch culvert (semicircular)	*Total area* s. ft.	*Drainage area* acres	*Remarks* *Mever formula*
3-ft.	7.78	3.78	$A=4\sqrt{C}$ for steep and rocky country. C is in acres.
4-ft.	17.55	19.25	
2— 4-ft.	35.10	77	
6-ft.	36.86	84.92	

Size of arch culvert (semicircular)	*Total area* s. ft.	*Drainage area* acres	*Remarks* *Talbot formula*
2— 6-ft.	73.72	309	$A=4\sqrt{C^3}$ steep and rocky country.
8-ft.	70.14	289.3	
10-ft.	96.3	441.4	
12-ft.	125.57	628.3	
15-ft.	196.38	1143.80	
2—15-ft.	392.76	2903	

For openings 25 per cent. under requirements the double four was used and for those 25 per cent. under 8-ft. requirements the double six. The double smaller openings were also preferred where foundations were found to be poor. The three foot opening was hardly used at all, the 24-in. concrete pipe being used for drainage areas of about six acres and the double pipe up to 14 acres.

Where drainage areas were too large to measure, flood level slope and cross-sections were taken, and with an assumed constant the Kutter formula $v=47\sqrt{rs}$ was used to calculate flood velocity. The amount of banking up which was to be expected from constriction of channel up to as much as 50 per cent. was also investigated in the manner described in Kempe's Engineer's Year Book—section on bridges—page 512, 1921 edition. Restriction to over 50 per cent. was not considered advisable.

Wherever drainage areas were measurable and demanded openings of over-culvert size the Kutter formula was checked against the quantity derived from drainage area considerations only, taking run off at 100 per cent. and rainfall at an inch an hour. In point of fact this rainfall was not excessive being exceeded in one or two cases. Rough estimate of the amount of run-off actually occurring in areas with bare rock upper slopes and valley bottoms planted as a rule with millet indicated about 77 per cent. after thorough saturation. This figure from weir calculations.

Formation. The following standards were adopted :

Banks of earth and all material liable to disintegration	.. 20-ft,
,, of surface rock and inferior rock	.. 18-ft.
,, of first class rock	.. 16-ft.

Slopes 1½ to 1 and in the case of rock the angle of repose, which experience showed to be never greater than 1¼ to 1.

Cuttings. These were made amply wide on account of troubles to be expected in North China from ice, and frost heave.

All soft material 25-ft. wide slopes not less than 1 to 1.

Good but not first-class weathering rock 20-ft. wide and slopes of ½ to 1.

First class rock 18-ft. with slopes ¼ to 1. Caution to be used in placing rock in this category.

As would be expected in very broken country it was found economical to run many of the cuttings to bank. For this purpose decauville track was used of a gauge of 2-ft. 6-in. with 16-lb. rail on steel sleepers in lengths of 16-ft. Tubs were of about 18 c. ft. capacity, some 6 miles of track and 270 tubs being employed fully during the working season. Questions of economic length of haul were gone into taking into consideration the expected price of the extra land required for borrow and stacking in the cut, the price of bank built from borrow, and balancing this against the cost of haul which averaged 2 cents per chain 100-ft. being free. Further the contents of the cut were often a controlling factor in this connection, rock often compelling the adoption of half borrow half haul method

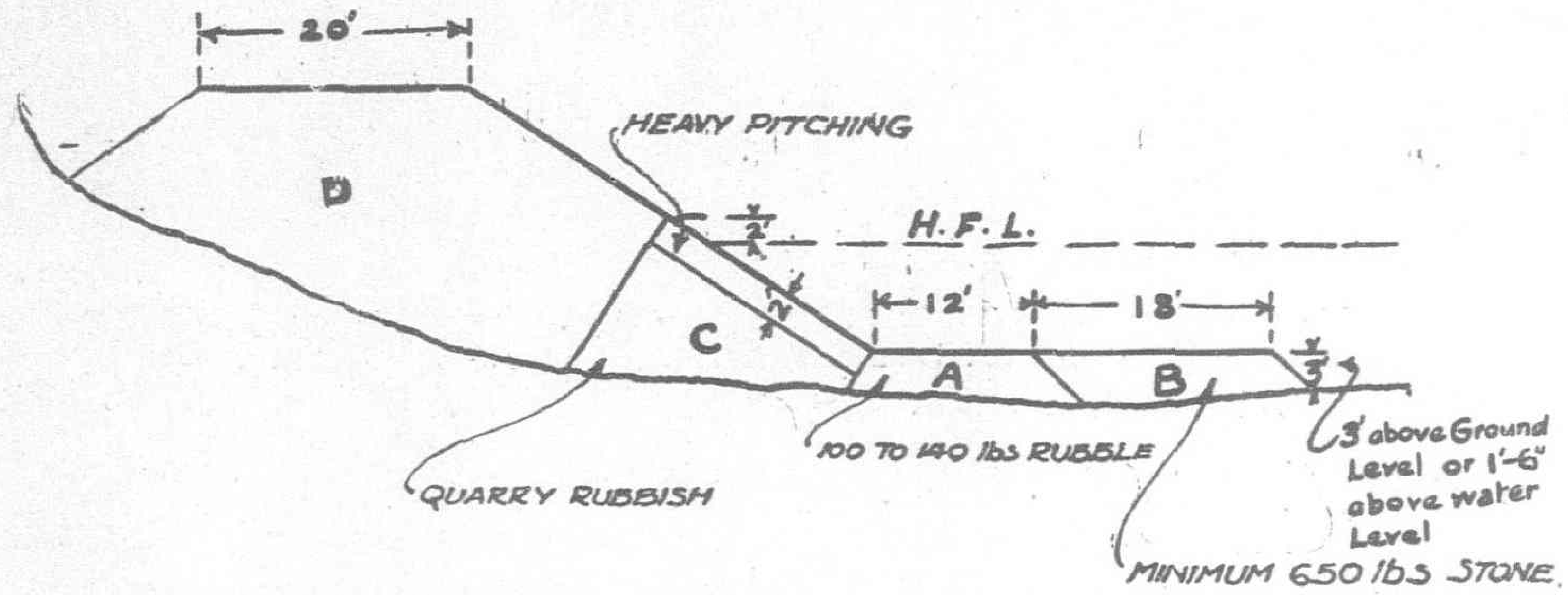


Figure 1.

of bank building. Further for banks of lenghts over 2,000-ft. and heights over 30-ft. haul from spoil pit above formation level is unquestionably most economical in China. For calculations of centre of gravity of a section of bank or cut the following approximate formula was used:

$$\text{centre of gravity is} \quad \frac{x\left(\frac{20}{3}-\frac{1.5\ x\ \tan a}{4}\right)}{\frac{20}{2}-\frac{1.5\ x\ \tan a}{2}}$$

where " x " is distance to tip head or cut face, 20 the bank formation width, 1.5 the bank slope for a $1\frac{1}{2}$ to 1 slope and " a " the approximate angle of centre line slope estimated from the profile of the line.

The most interesting piece of formation work, on account of its somewhat experimental nature, was the two miles of heavy protection work where the line was located in the bed of the Ta Ling River. This river is a considerable stream in times of flood. Rough gaugings during the high flood of August 1923 gave the following approximate discharge data: Width 2,000-ft., depth 12 to 15-ft., velocity 14-ft. per second, estimated discharge 180,000 c. ft. per second. The form of protection adopted was as in the diagram below, this having been tried on a smaller scale on the construction of the main line in 1902. The rock used for protection was a hard black basalt which out-cropped at this point along the river edge.

This stone had in the case of one quarry the well known columnar structure and stone could be quarried almost without the use of powder of 10 cub. ft. in size and lengths up to 6-ft. Almost all the heavy protection stone was obtained from this source. For handling this heavy stone in those parts of the river bed where there was water to contend with berm " A " was completed first with small stone weighing from 100 to 140 pounds a piece and a temporary track was laid on this for dumping the heavy stone for berm " B." The weight of stone used for berm " A " is not of course advocated; lack of time and labour troubles compelled the adoption of this course. It was imperative to get this section of line protected before the rainy season broke as the earthwork of the banks on this length was carried on simultaneously with the pitching. The cost of the protection only of this length amounted to $600 per chain or £72 at $8.40 to the pound. In 1923 owing to under-estimation of flood levels the pitching was topped for a short time and some slight damage done. This was repeated in the following year, the flood level exceeding that of the previous year. In this case some 1,500-ft. of bank from the point east of C in the diagram was lost. The point " C " is the danger point, currents A and B converging here setting up waves and eddies which scoured the river to such a depth that the berm provided proved inadequate and the pitching not heavy enough to resist the wave action. The railway was not however so badly damaged that temporary repairs were difficult. At this point it was decided to deviate further into solid cliff face to flatten the slopes of bank to 2 to 1 put in 4-ft. of heavy pitching and increase the berm to 30-ft. in width.

Two tunnels were found to be necessary on this length, one a short one of 383-ft. which was in very hard rock requiring no lining and calling for no particular comment, the other of a length of 3,894-ft. in a friable horizontally bedded green sandstone requiring lining to all the arch and side walls to a considerable extent. Both tunnels were driven by the top heading (Belgian) method and in the case of the longer tunnel the very great advantages (apart from its suitability on other counts) of this method in countries where expert timber men are nonexistent were very well ilustrlated. The top heading on completion was widened out to full size to admit of turning the arch for which cills were excavated to depths from 3 to 6-ft.

The arch was made of pre-cast concrete blocks, this being the only feasible way of ensuring a sound job and that the proper thickness of arch lining was put in. A further reason for the adoption of concrete blocks was the absence of suitable bricks and the certainty of proper supervision in making the blocks, these being cast outside the tunnel.

On completion of the arch the cills were under-pinned in six foot lengths. The question of sidewall thickness was a continual problem owing to the varying character of the rock. Where the rock was disintegrated into what had the appearance of a hard clay the side lining was 2-ft. thick in 1 : 3 : 6 concrete. Where the rock was rotten and showed signs of weathering badly the sidewall thickness was 1-ft. 6-in. in 1 : 4 : 8 concrete except in very wet places where 1 : 3 : 6 was used. For a length of 60 per cent. of the tunnel where the rock was sound but its weathering qualities open to doubt, pillars 18-in. thick were inserted, the rock surface between pillars being cut back to admit of a plaster of at least two inches being put in. The pillars were put at varying distances as below. They were all in 1 : 3 : 6 concrete.

Arch cill. 6-ft. below springing, pillars 6-ft. wide with 12-ft. between pillars.

Arch cill. 3-ft. below springing, pillars 6-ft. wide with 9-ft. between pillars.

Tunnel drainage in a country where 40 degrees of frost is possible and a zero temperature the usual thing from December to March was a question of some difficulty. During construction and after the tunnel was opened in November 1923 this difficulty was temporarily solved by having large matting doors at each portal which were kept closed between trains. As a tentative permanent solution of the problem a concrete, slab-covered, side drain was adopted which drained to catch pits at the North portal where pipes below the frost line were laid to a large blind well at the mouth of the approach cutting. Fortunately the amount of water in the tunnel was not at any time great, one double acting six inch Worth-

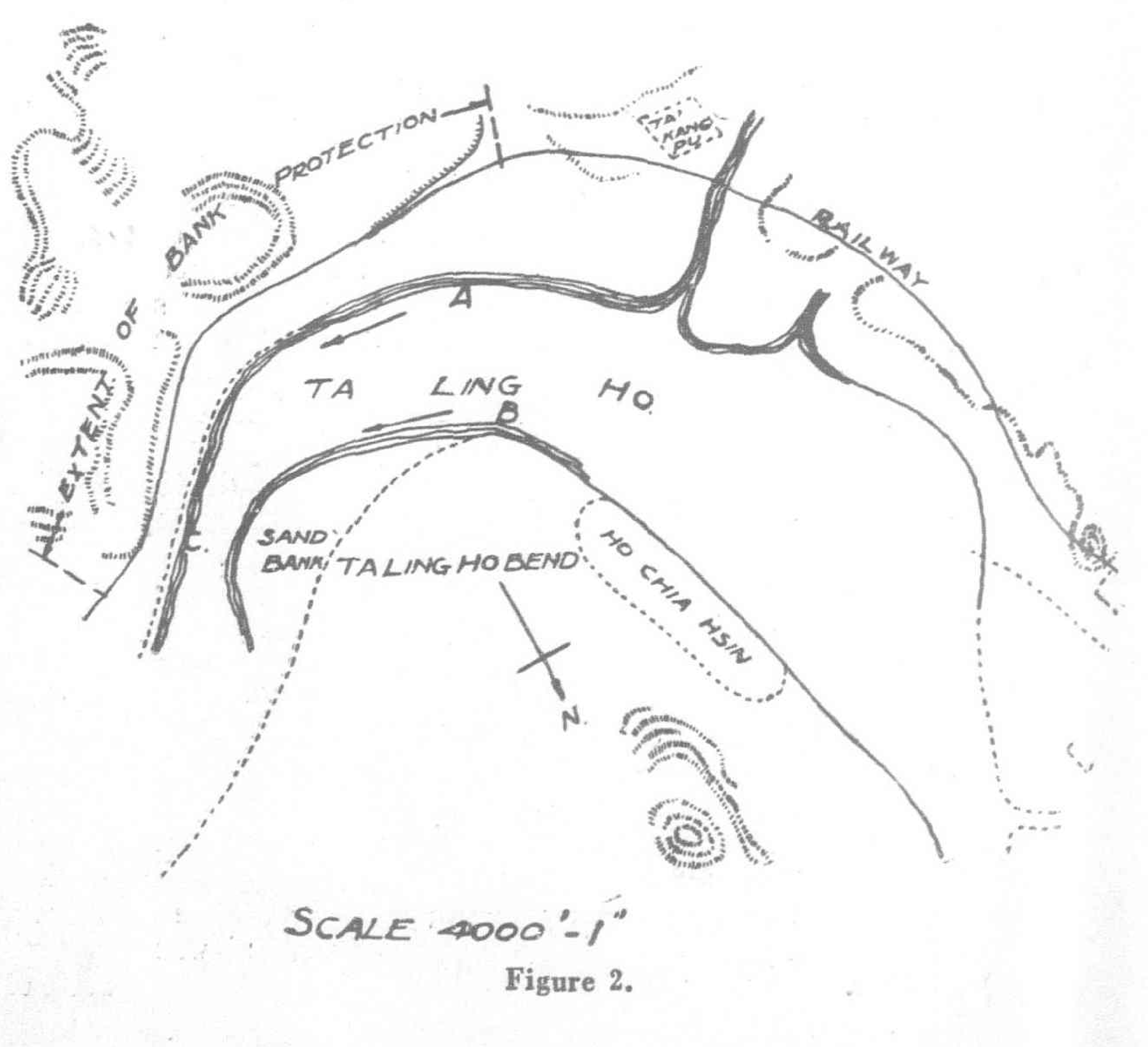
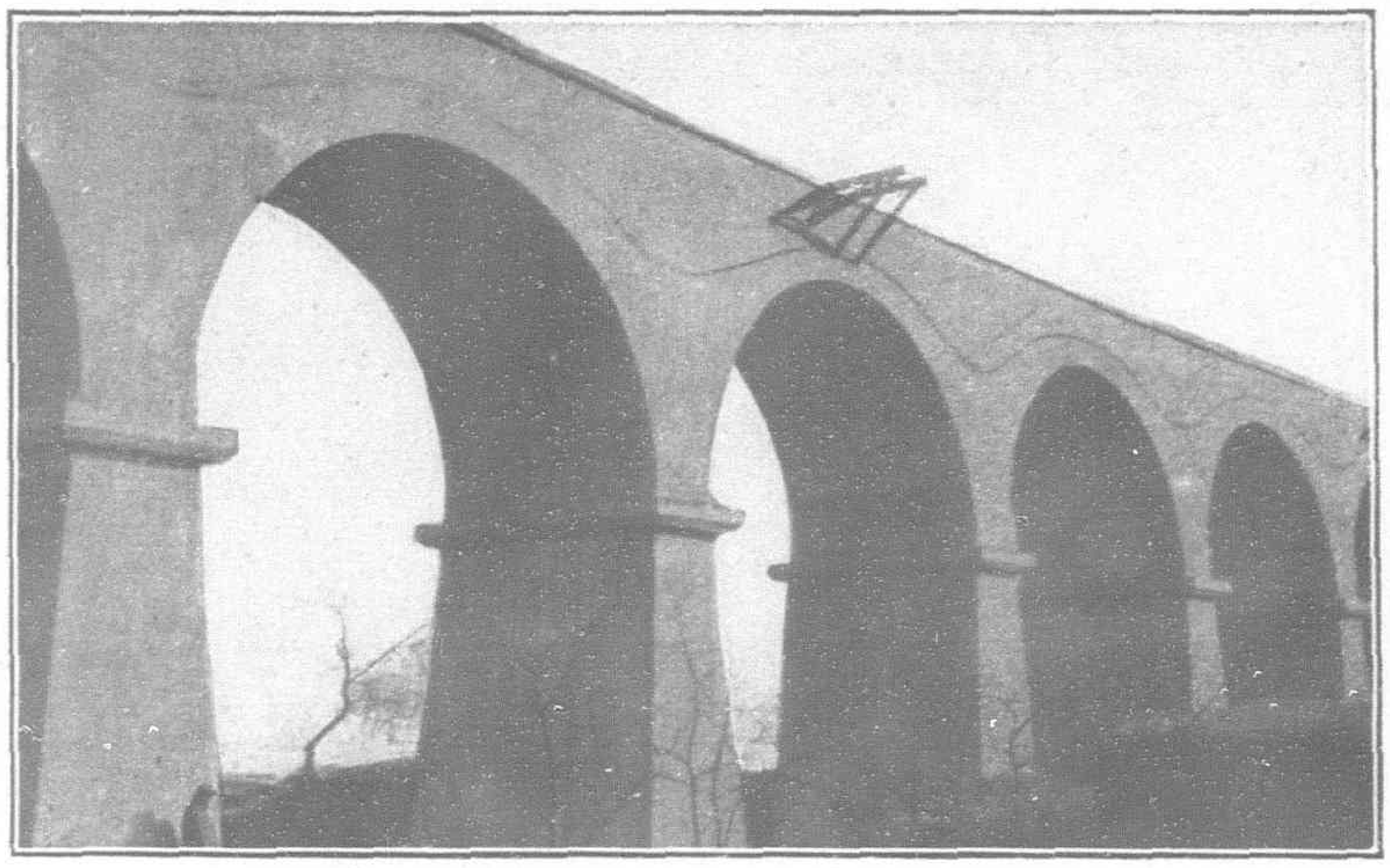


Figure 2.

ington pump in each shaft, working intermittently, amply sufficing.



Eight Arch Viaduct

The tunnels were all built for single line of the following dimensions: Arch semi-circular 8-ft. radius. Height from rail to springing of arch 14-ft. Arch thickness where lining used 1-ft. 6-in. The attached plan (Figs. 2 and 3) gives detail of lining, etc. As regards the construction scheme, the tunnel had three shafts which were served by double, steam winch-hauled, cages which handled the 18-in. decauville wagons used between the shafts. At the portals 2-ft. gauge decauville track was used. All spoil was hand hauled to the dumps. Drilling was done entirely by hand though steam drills and steam driven fans for ventilation of headings were offered to, and refused by, the Chinese contractor. Dynamite, fuse fired, was used to a very large extent as the amount of water present precluded the use of native powder which was used for rock excavation wherever possible. Work was carried on night and day. The headings were begun in June and July 1922 and holeing through took place on February 24, 1923, the tunnel being opened for traffic on the following November 24. The size of heading

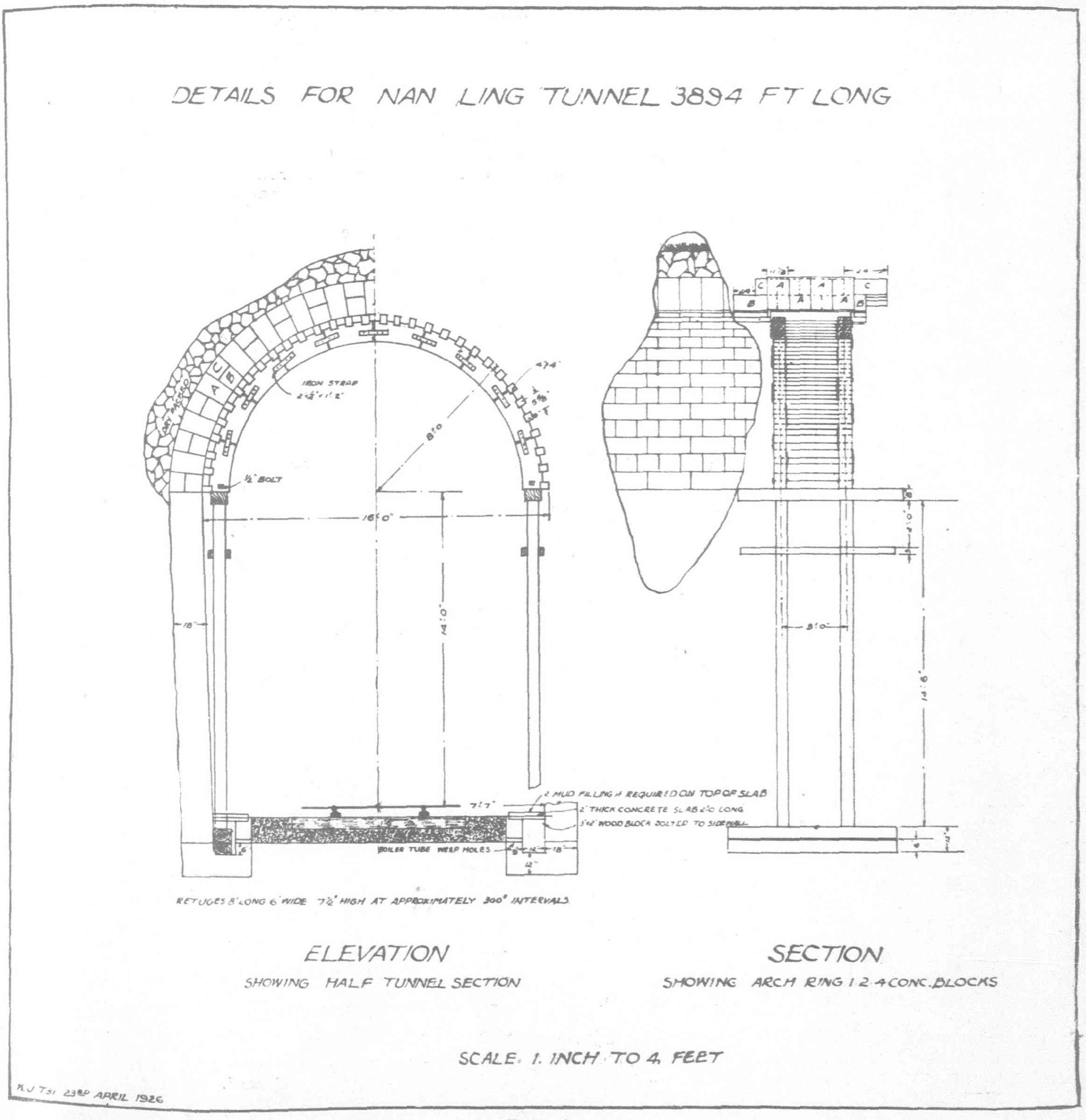

DETAILS FOR NAN LING TUNNEL 3894 FT LONG
DRY PACKED
A
B
C
IRON STRAP 2½"×1'2"
½" BOLT
8'0
16'0"
14'0"
18"
7'7"
2 MUD FILLING IF REQUIRED ON TOP OF SLAB
2" THICK CONCRETE SLAB 2'0 LONG
3"×2" WOOD BLOCK BOLTED TO SIDEWALL
BOILER TUBE WEEP HOLES
6
12"
18"
RETUGES 8' LONG 6' WIDE 7½' HIGH AT APPROXIMATELY 300' INTERVALS
8'0
14'6"
ELEVATION
SHOWING HALF TUNNEL SECTION
SECTION
SHOWING ARCH RING 1 2 4 CONC. BLOCKS
SCALE 1 INCH TO 4 FEET
K.U. TSI 23RD APRIL 1926

Figure 3.

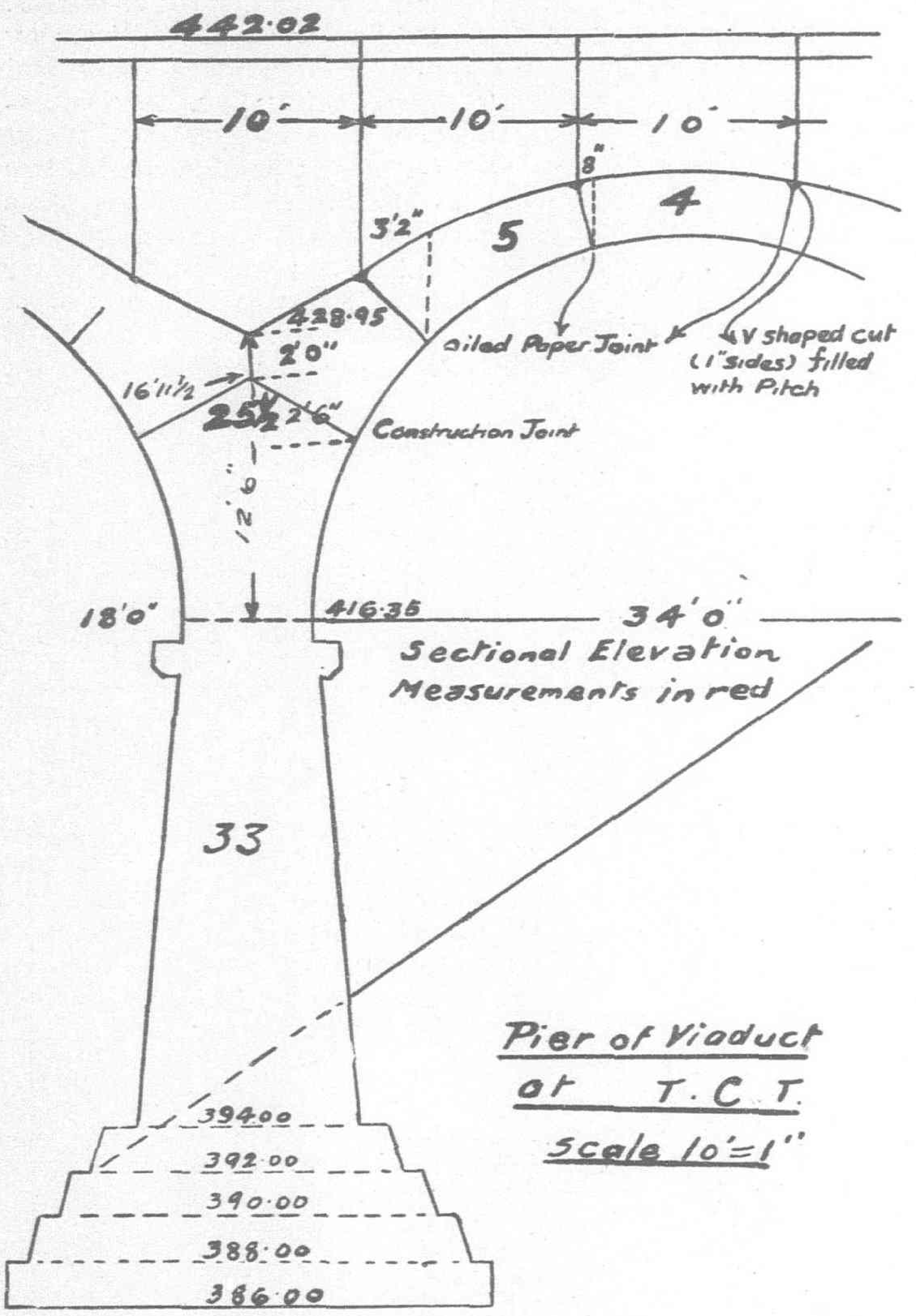


Figure 4.

first driven was about 8-ft. wide by 8 high. The only serious mishap which occurred was the bursting of a heading drain dam in the South approach cut during the torrential rain of the night of August 21, 1923. This caused the flooding of the tunnel as far as the second shaft and delayed work in this sector for a fortnight.

Data relating to the Nan Ling Tunnel of 3,894.8-*ft. length.*

Gross excavation (solid)	69,388 c. yds.
Nett excavation	61,140 „

Excess excavation 13.5 per cent. of which 73.6 per cent. was above springing equivalent to 1-ft. 6½-in. average depth. Below springing this amounted to 5.65-in. outside the neat line.

Average daily progress all headings ..	2.75-ft.
Maximum „	4-ft.

Explosive per solid c. yd., headings only, 1.03 lbs. of dynamite and 1.64 lbs. of native powder.

Explosives per c. yd. whole section 0.26 lbs. dynamite and 0.81 lbs. native powder.

Cost per ft. run total $129 or £15.7.0 without engineering or Head Office charges.

Cost per ft. run without lining and approach cuts $73.15 or £8.14.0.

Exclusive of the tunnels, the following is the amount of formation work done in the working season of 1923—April to mid November.

Earthwork	2,400,000 cub. yds.
Rock excavation	880,000 cub. yds.
Rock excavation in tunnels	70,000 cub. yds.

The number of men employed on this work is extremely difficult to estimate as all work was on a contract basis, but it cannot have been less then 15,000 on the 37 mile section.

Culvert and bridge work in this heavily gulched country was naturally heavy. There were 118 culverts and 29 bridges on the 37 mile section giving a total opening per mile of 137-ft.

Arch culverts were very extensively used as headway was in most cases ample. The majority of these were in concrete and where this material was employed they were of the usual type, but all culverts over and including 8-ft. span were provided with contraction joints in the arch for which two thicknesses of a coarse tough oiled paper were used, this being pasted over the concrete surface where it was desired to form a joint.

In the neighbourhood of the coal mines a hard burnt shale brick was obtainable and this was used for all arches here in conjunction with coarsed sandstone or lime stone rubble.

Heavy calls on the railway bridge-works for renewals and double tracking also entailed the adoption of arches in plain concrete for spans of 30 and 34-ft.

The 34 foot spans were all in a viaduct of 8 arches crossing a gulley at a maximum height of 55-ft. on a three degree curve. The foundation was in hard clay which was tested up to a load of two tons per sq. ft. and loaded with a maximum load of a ton and a half in the finished structure. The arches were designed for Cooper's E 50 loading and were made 2-ft. 6-in. at the crown with 3-ft. of cover at that point. Pier thickness was 6-ft. at springing of arch and in the case of the abutments which were of the buried wing type 9-ft. at springing of arch. The general details are as in the plan attached, see Figs. 4 and 5.

There are four contraction joints per arch made as in the case of the culverts with oiled paper. The arch from springing upwards was in 1 : 2 : 4 concrete with the exception of the key block which was made in 1 : 1 : 2 concrete to admit of striking centres after seven days. The arch was only water-proofed with pitch over the joints a " V " shaped notch with 1-in. sides being cut in the concrete over these and pitch poured in. Elsewhere the arch was waterproofed with a rich mortar worked over and over till nearly set.

As regards construction details the whole of the concrete was hand mixed and in the case of the piers was carried up on inclined

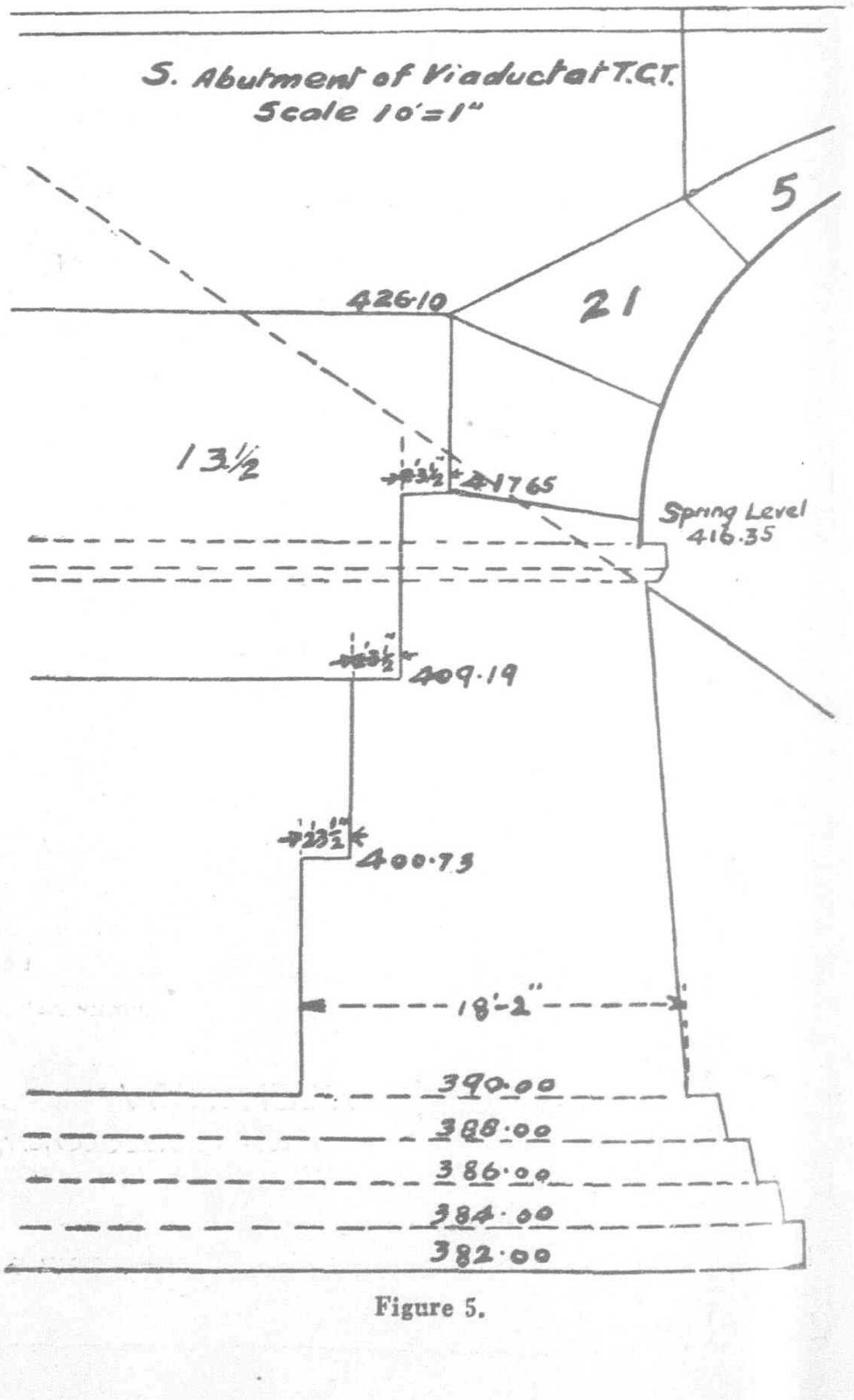


Figure 5.

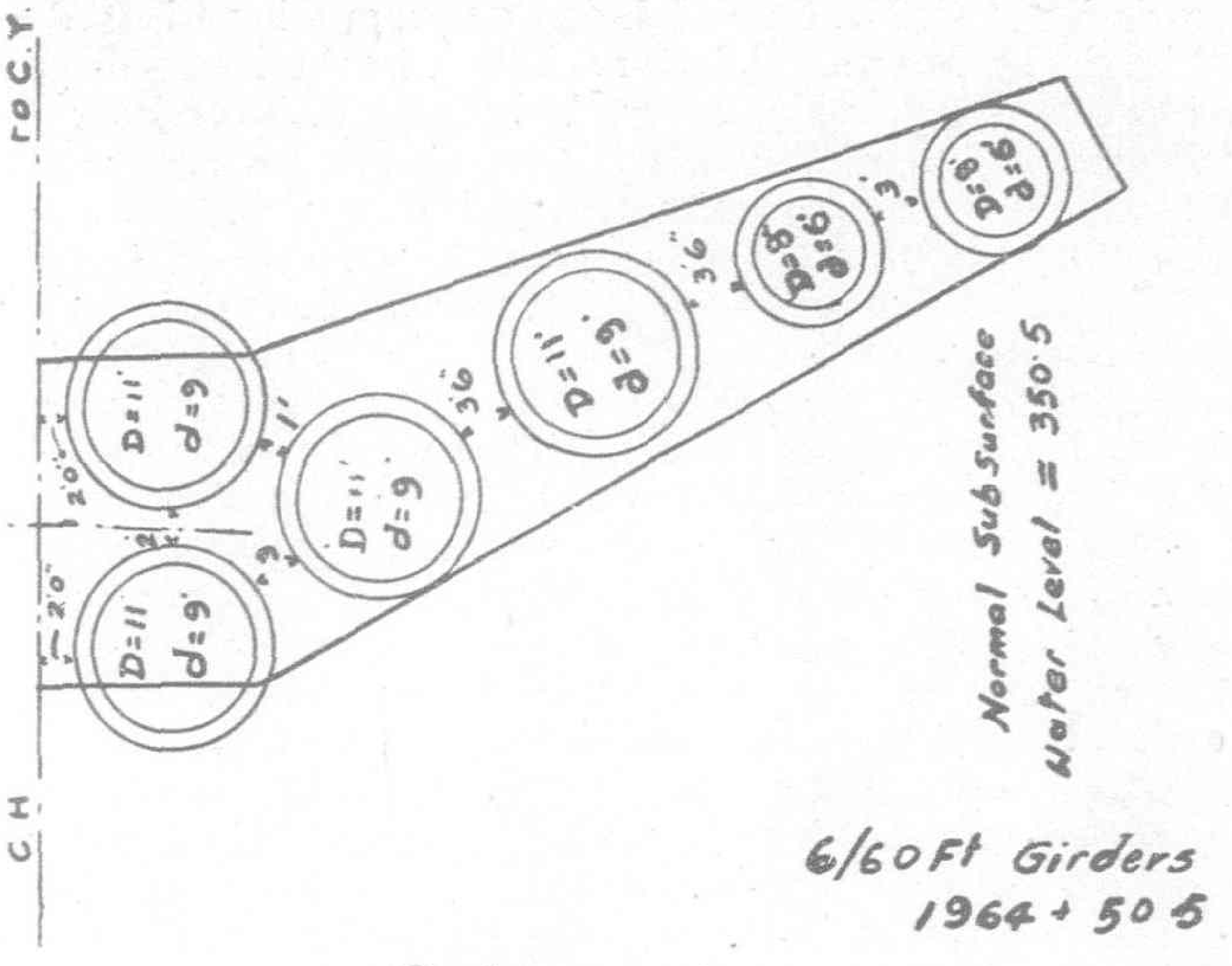
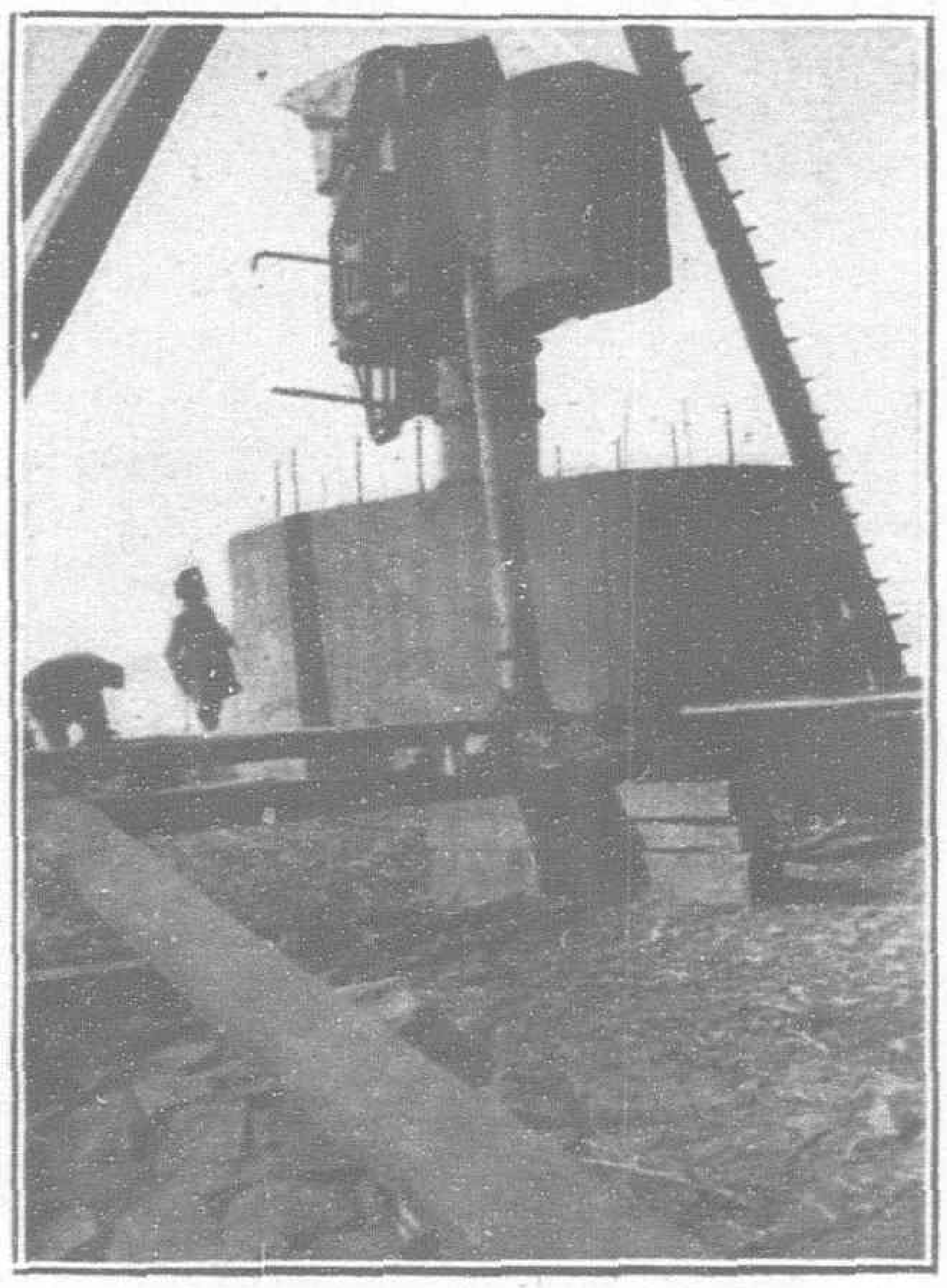


Figure 6.—Well Foundations

ways made of sleepers and planks. The arches were all cast from one end and the raw materials being carried up and mixed on platforms built over the arch haunches, these platforms being moved forward as the arches progressed. The arch centres were supported on cornices 1-ft. 10-in. thick which were re-inforced with scrap pieces of 60 pound rail at four feet centres --the spacing of the arch centres. Four sets of centres were used and no centre was struck, no matter what the age of the arch concrete, until the two arches ahead had been keyed in. The centres were supported on hard wood wedges 2-ft. in length by 8-in. wide a taper of two inches on a minimum thickness of two inches.

The following table shows the total settlement which occurred. This was only serious in the case of the South Abutment where an undiscovered soft patch in the foundation caused both vertical settlement and motion at right angles to the railway. As a consequence of this a longitudinal crack developed in one wing wall and the contraction joints opened up in the two arches closest to the settlement. This was remedied by keeping in the centres of the last two arches and pushing forward the filling to counteract the backward tilt of the abutment, the burying up of this being also expected to stop the sideways motion. Expectations were realised in this respect and the resulting opening up of the arch joints was made good by grouting. The striking of the last two sets of centres was also delayed for two months.



Air Lock, Ta Ling Ho Bridge

Total settlement of viaduct during construction.

South abutment	0.32-ft.	Pier No. 5	.. 0.02-ft.
Pier No. 1	.. 0.01	Pier No. 6	.. 0.01
Pier No. 2	.. 0.06	Pier No. 7	.. 0.01
Pier No. 3	.. 0.03	North abutment	0.06
Pier No. 4	.. 0.03		

The structure contained about 7,000 cub. yds. of concrete, 6,900 drums of cement being used, concrete being proportioned as follows:

In foundations and plinths 1 : 4 : 8. In piers, spandrels and copings 1 : 3 : 6. In arch as previously stated mainly 1 : 2 : 4.

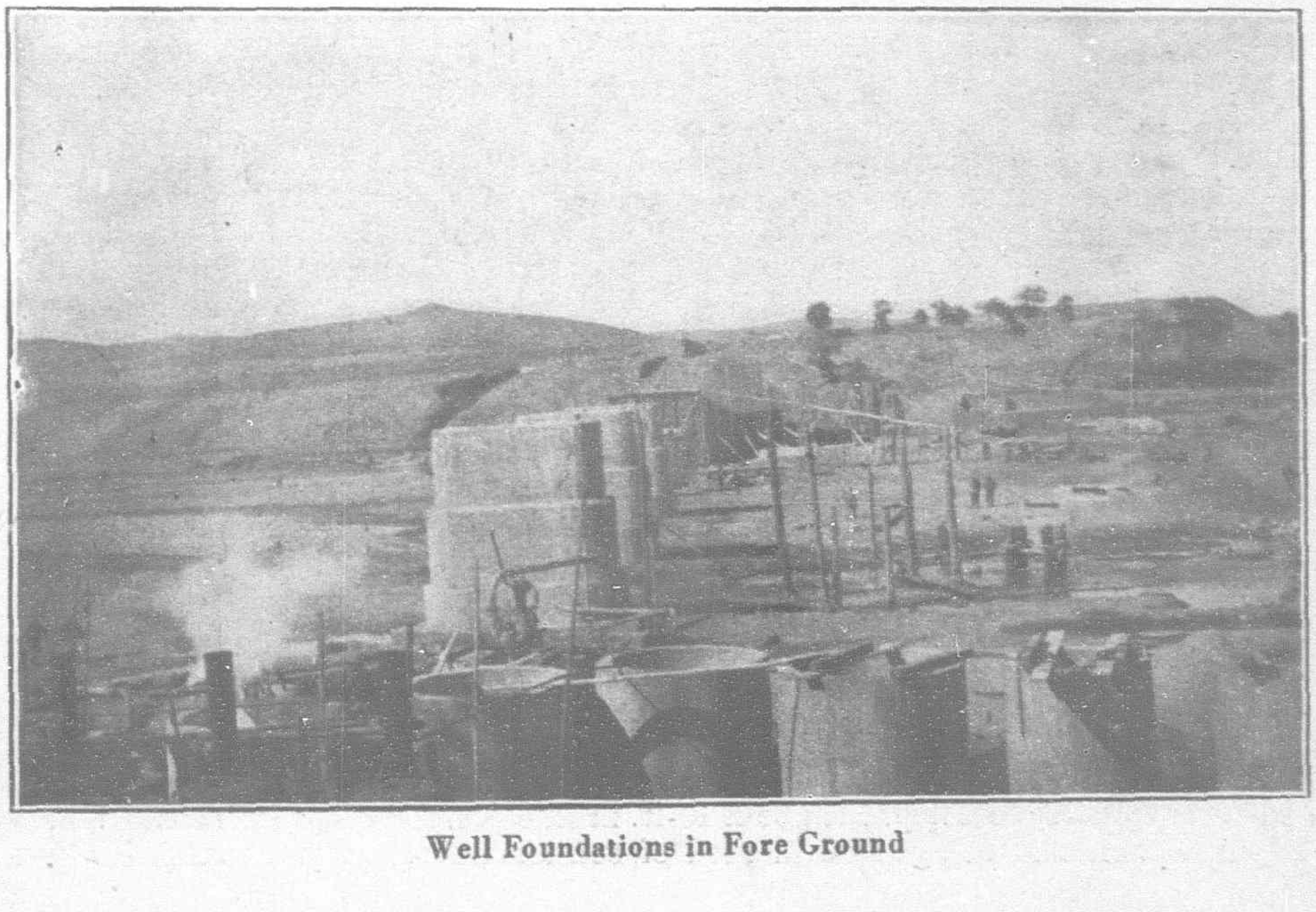
Concreting of the foundations began on March 31, 1923, the piers and abutments to springing were completed on June 5. The first arch was keyed on June 18, the last on July 29, and the viaduct was opened for traffic on October 5. Up to springing level the placing of the concrete was done by contract, above that point the work was done entirely by day labour, about 140 concrete coolies and twenty carpenters being employed continuously. The time taken for casting an arch was 3½ days. The casting of concrete was carried on without interruption between joints of arch. The cost of the structure was $199 (£23.14.0) per foot of arch opening.

In the case of the 30 foot arches the same procedure was adopted, but in this case the centres were either supported on sleeper stacks where there was not much risk of flood, or in doubtful localities, by single tiers of sleepers which rested on the footings and were secured by walings bolted through bolt holes used in the casting of the structure below springing.

The general plan details were exactly as for the 34 foot arches. For the foundation however wells were very largely employed as the streams crossed were full of boulders and quite unsuitable for piling. Most of these streams were dry during the winter and early spring and it was found possible in all these cases to get the wells down to a safe foundation using four inch barge pumps only; as many as four per well being employed in porous ground at shallow depths and at the greater depths in clay where such sinking was carried to a maximum depth of 22-ft. These wells were arranged as in the plan (Fig. 6), but in general two sizes of wells were used for all cases, 9-ft. internal diameter under the piers and a combination of 9-ft. and 6-ft. wells under the abutments (see Figs. 7 and 8). These wells were all in 1 : 2 : 4 plain concrete with a shell one foot thick the bottom 3-ft. being widened out to 1-ft. 3-in. thick with a 45 degree cutting edge at the bottom. The lifts put on, as sinking proceeded, varied from 3 to 9-ft. No trouble at all was experienced from excessive leakage or cracking. On reaching a satisfactory bottom the wells were sealed off under water with a two foot thickness of 1 : 2 : 4 concrete. When this had set the well was baled out and the well filled to footing level with 1 : 4 : 8 concrete.

Wells were also adopted in three cases where water was flowing freely on the surface to a maximum depth of about two feet under low water conditions. The river-beds in two cases were composed of gravel and sand in alternate layers mixed with large boulders overlaying a rock bed of hard basalt at a depth of about 13-ft. in one case 15 feet the other. In the last case the river bed was sand as far as hand boring tackle was able to go and in this case it was considered that with the opening provided seventeen feet of sinking would place the foundations out of all reach of scour.

In the above cases it was of course necessary to use steam pumps for unwatering, and for this purpose the direct driven six inch centrifugal pump was found to be the most satisfactory on



Well Foundations in Fore Ground

account of its lightness. These pumps were mounted on two twelve by twelve baulks bolted together, these timbers being of sufficient length to span the wells. They were connected to the main steam pipes through a fifteen foot length of flexible inch and a half copper corrugated tubing, which was always, except when quite new, responsible for a very high steam leakage. Two such pumps were always found sufficient to cope with the water. These pumps had a 6-in. cylinder by a six inch stroke and were run at about 500 revolutions. Considering the rough handling they came in for, especially under winter conditions of work they gave astonishingly little trouble. For winter work in Manchuria these pumps should be fitted with drain cocks to avoid damage to casings as happened in one instance when the pump was not drained after stopping work.

On reaching rock the rotten surface was cleaned and a sump cut in the middle of the well for the pumps. A circular wooden drum 4-ft. 6-in. diameter by 2-ft. 0-in. high was then sunk in the middle of the well and a concrete sealing layer for the edge of the well placed under water between the well shell and the outer surface of the drum. This concrete was 1 : 1 : 2 mixture. This sealing layer in some cases would be tight enough to admit of baling out the well and cutting out a clean key of rock 4-ft. 6-in. diameter in the centre of the well, in other cases it would be necessary to put back one centrifugal pump for cutting this key. The key was then sealed with concrete under water and the well filled with 1 : 4 : 8 concrete to footing level.

Pier wells were tied together with a heavy rail re-inforced footing 4-ft. thick. Where it was not possible to sink this with sheeting or horizontal planking in the usual way a rectangular concrete caisson was used for these small depths of about 5-ft. This was made 1 foot thick and re-inforced with cement drum strips 4-in. wide, or better with bamboo. These footing caissons were 34-ft. long by 18-ft. 6-in. wide and they were stiffened centrally by two short beams at the top and bottom of the caisson, these beams being 12-in. square in section.

On the pier wells for 100 foot spans the total pier foundation—two 9-ft. diameter wells—provided was 192 s. ft. giving a foundation pressure without any skin friction of 3 tons per sq. ft. approximately. Cost of well sinking was about $22 or £2.13.0 per cub. yd. displaced.

Considerable use was also made of concrete pipes of two and three feet diameter for drainage areas up to 14 acres. These had a re-inforcement of telegraph wire and were 3½-in. and 4-in. thick of 1 : 2 : 4 concrete cast in 3 and 6-ft. lengths. Where these pipes were used in banks under 10-ft. in height they were backed with rubble masonry 18-in. thick for the middle 10-ft. and where banks were higher than this the backing was extended to 20-ft. in length.

One experimental 48-in. concrete pipe was tried. This was re-inforced with rigns of ¼-in. sq. iron at 3-in. centres and ¼-in. longitudinal bars spaced 8-in. centres. The pipe was cast 4-in. thick in lengths of 8-ft. and proved quite a satisfactory job.

Concrete pipe gave uniform satisfaction and as compared with the small concrete culvert were infinitely quicker and at the same time cheaper. Only double pipes were allowed. Pipes and culverts were contoured wherever this was found feasible in order to save length, a heavy rubble drain being inserted at the lowest part of the bank to cope with the resulting undrained pocket.

All sand for concrete was tested for tensile strength, the strength of the mortar used in all tests being 3 to 1 and the age at testing 7 days. One hundred pounds per sq. inch at this age was considered safe enough for the very low stresses prevailing in mass concrete. In re-inforced concrete work sand was specially selected.

The biggest bridge on the extension was that crossing the Ta Ling Ho at Mile 59. This crosses the river at a height of 32-ft. above low water, low water at a maximum being about 4-ft. in depth. The river bed was 3,300-ft. wide at this crossing and it was decided to bridge this with sixteen 100-ft. spans. The normal unrestricted flood level in the river was some 12 feet over low water level.

With the exception of the wings of the well sheltered south abutment all the foundations were placed on steel caissons which were sunk by compressed air. These caissons were elliptical in shape with a base area of 228 sq. ft. and a working chamber height of seven feet in which six men could work with comfort. Their weight was about 9 tons unfilled the skin filling being of 1 : 2 : 4 concrete.

Borings indicated that a layer of silt and sand of varying coarseness overlay a thick bed of very hard clay. The caissons were sunk into this clay to a depth of about 10-ft. in all cases.

The plant and the general method of construction employed were designed by Mr. C. W. Kinder, C.M.G. and have been described previously by Messrs. Rigby and Leitch in the Proceedings of the Institution of Civil Engineers, Vol. 160, 1904-5. Four tandem horizontal 12-in. by 12-in. by 24-in. air compressors working at 75 r.p.m. were used for which ten, 10 horsepower, boilers plus two spares were required. The compressors were placed in two 40-ft. by 40-ft. engine houses directly opposite piers six and twelve. These engine houses were built of two inch plank, covered inside with straw matting and also papered at the joints, this precaution being taken to limit as much as possible the admission of the very fine silt which formed the river bed top surface, and which the slightest breeze raised in clouds while the wind storms prevalent in winter masked the whole countryside in impenetrable red-brown fog. For the same reason the air intake of the compressors was placed inside the engine houses and this had the disadvantage of causing the occasional freezing up of the air intake tees to the air locks ; a preferable choice of evils however compared with damaged compressors. Ten of the standard air locks with five separate winch boilers were employed. The main 2½-in. air line running parallel to the bridge axis was from 15 to 20-ft. from the bridge centre, the connection to the air locks off this being made with armoured rubber hose. Pressures during construction never exceeded 20 lbs. per sq. inch and not more than three caissons were under air at any one time.

Railway traffic for, and north of the bridge, was carried across the river on a temporary bridge of forty two twelve foot spans on pile trestles built 100-ft. down stream from the permanent centre line. The engine house boiler annexes abutted on this bridge so that coal was shot down almost in front of the boilers whose centres were fixed at about 16-ft. from the nearest rail.

The construction scheme aimed at getting all the sinking in the low water channel of the river—about 500-ft.—done during the winter when this was frozen to a depth of at least two feet, capable of sustaining with ease the weight of an air lock—about 4 tons. Here the caissons were unloaded on to the ice and hauled over to the pier sites where they were erected on previously prepared islands built of a rubble shell with a heart of small ballast and mud. They were sunk empty to water level when they were filled with concrete to two feet above the top of the working chamber preparatory to air-sinking. The caissons above low water were erected in holes dug down to the ice level. The first lift of concrete was as stated above—two feet over working chamber top—thereafter the lifts were 8-ft. The normal rate of sinking in sand or coarse gravel without boulders of such a size as to necessitate the use of the man lock, was 8-ft. in the 24 hours. In the hard clay this fell to 1-ft. 6-in. in the same interval.

All the air work was carried out without incident of moment, the only serious difficulty encountered being the jamming of the most of the caissons after penetrating about 5-ft. into the clay. This may have been due to " swell " of the clay. This difficulty was overcome in the usual way by weighting the caissons with about 30 tons of rails and then removing the air pressure as rapidly as possible. This caused delay to the sinking programme which was further accentuated by a most unusually warm spell in February which caused the river to burst through the ice above the bridge and flow over the frozen surface for about a week, after which cold weather again supervened. The engines and air receivers in the engine house which was in the channel were placed on a wooden base which rested on piles and the air line in the channel was also pile supported. This turned out to be a very necessary precaution as owing to delay in sinking this engine house was exposed to the heavy scour due to the freshet resulting from the break up of the ice in March.

Protection work for the major bridges was a heavy item. In the case of a big bridge as above where opening was restricted, the approach banks were pitched to two feet above the expected new flood level and a berm of heavy stone provided as in the case of the river protection work previously described. The berm of heavy stone was not so wide as in the case cited, being 25-ft. in the case of the Ta Ling Ho Bridge and 12 in the smaller bridges where river conditions were not so severe. Further in the case of all bigger bridges up stream and down stream training banks were provided to throw the eddies resulting from conflicating currents away from the abutment. Up stream training banks were made at least a span and a half in length down stream a minimum of 50-ft. These were carried about 5-ft. above expected flood, built of first class material heavily pitched and provided with an apron of heavy stone—5-ft. thick. All culverts were also provided with an apron of heavy stone at least 10-ft. in length below where the invert ceased; the down stream apron having specially heavy stone. Top width of training banks was a minimum of 10-ft. and slopes 1½ to 1.

Through track-laying began on October 7 from mile 39 and was pushed on without a break till mile 67 was reached on January 16. Six stations were laid in and seven deviations with temporary bridges. The track is a 60-ft. rail, 30-ft. long, laid on Oregon sleepers, fourteen to the rail.

The station lay-out for passing stations is as usual for single tracks, up and down loops protected by locking bars and detected with the signals being provided. The signalling consists of an eight lever frame fixed centrally which works all the signals—up and down homes and distants and starting signals. In addition, catch sidings are provided in the case of those stations where it is possible for a train to overrun. All Points are hand worked. At Nan Ling station where the signal would have been inside the tunnel, this is placed at the North Portal and operated by electric motors from the cabin. Webb and Thompson's electric staff is used for train control.

It should be stated here that with the exception of the work on the Ta Ling Ho Bridge the work described here was of necessity almost entirely completed ahead of rails. All plant for the tunnel and all cement for those structures considered vital was handled by native carts over the unmetalled roads of the country. The disturbances resulting from the civil war of the autumn of 1922 caused great delay to the preliminaries of construction and recruiting in the spring and summer of 1923 when construction was in full swing was responsible for a serious labor shortage at a most critical period.

The staff employed on the work at various periods was as below:—

Preliminary surveys and reconnaissances ..	Mr. J. C. Steen
March 1921—October 1922, Resident Engineer in charge of Tunnel at Nan Ling and surveys Mile 32 to Mile 59	Mr. H. Farrant, A.M.I.C.E.
Assistant Engineer in charge of Tunnels and Ta Ling Ho Bridge from June 1921 ..	Mr. B. L. Jacobs
Resident Engineer in charge October 1922 to April 1924	H. Stringer
Assistant Engineers during this period ..	Messrs. A. H. Douglas, A.M.I.C.E., B. L. Jacobs, K. S. Wang, 8 cadet engineers, 2 student engineers.

The work was under the general supervision of Mr. W. O. Leitch, M.I.C.E., Senior District Engineer and was carried out under the direction of Mr. L. J. Newmarch, M.I.C.E., General Manager and Engineer-in-Chief of the Peking-Mukden Railway to whom I am indebted for permission to make use of the plans from which the diagrams in this article have been prepared.

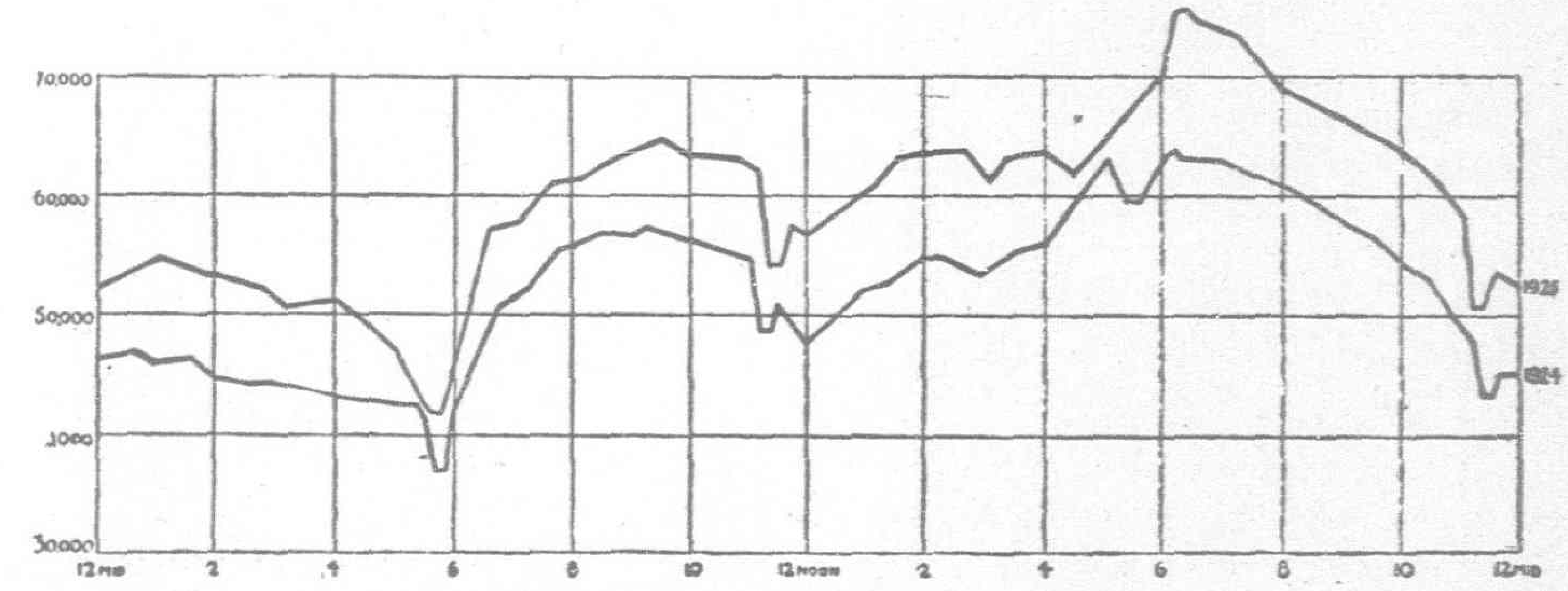
Throughout this article the rate of exchange from dollars to sterling has been taken at $8.40.

The Chinese cubic measure of 1 fang—110 cub. ft.—has been converted to cubic yards at the rate of 4 yds. to the fang.

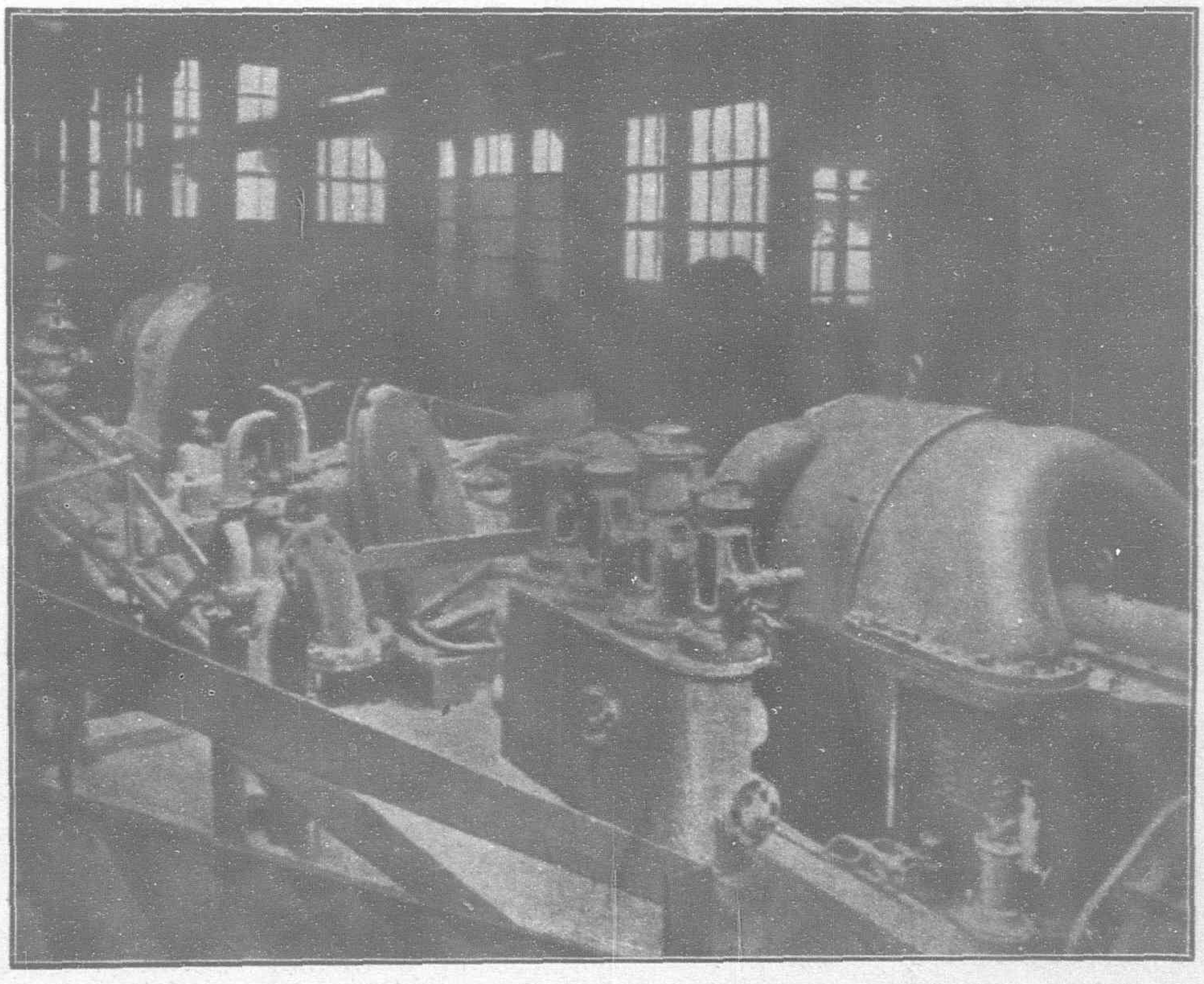
The line being still in an incomplete condition it is not possible to give costs with any certainty but an indication of the probable cost is given by that of an almost completed section of 12 miles from Mile 33 to Mile 45. This worked out at $77,839 per mile or £9,250 approximately without engineering or Head Office charges.

The Shanghai Load Curve

A VERY interesting load curve covering the 24 hours of Tuesday, December 30th, 1924, and Tuesday, December 29th, 1925 is herewith reproduced. The magnitude of the industrial load can be gauged from the fact that neither the lighting nor the domestic heating load (the latter being estimated at about 4,000 kw.) super-imposes any serious peak on a fairly flat power demand. It is a testimonial to unified control that the output of this Central Station in the Far East is greater than that of all the London Municipalities put together and possibly greater than that of all the Metropolitan Companies put together.



Vertical figures on the left in kilowatts.



The "Metrovick" 20,000 kw. Turbo-Alternator, erection nearing completion at Shanghai

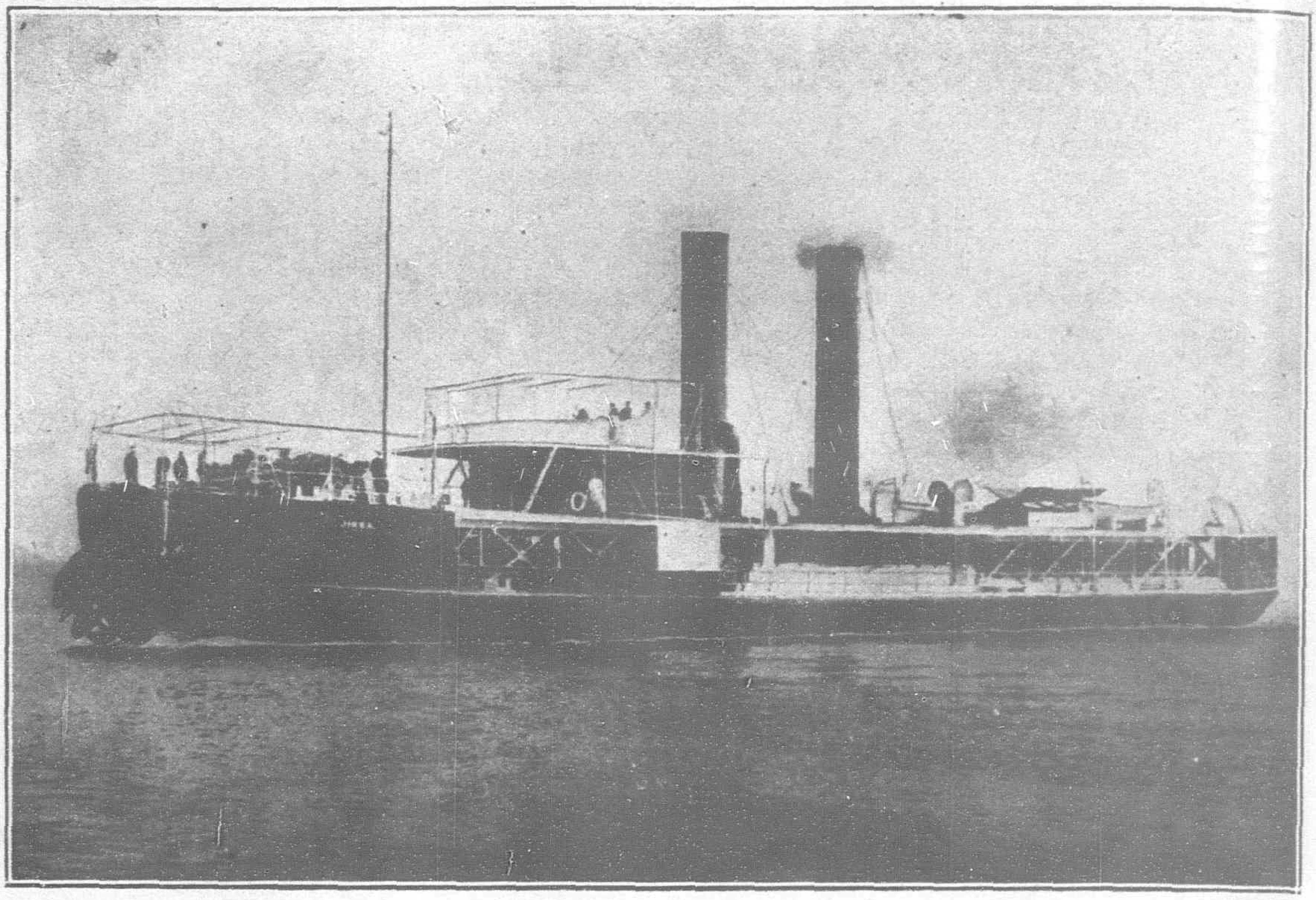
Five New Steamers for Netherlands East Indies Trade

The increasing coastal trade around the Netherlands East Indies has resulted in the Koninklijke Paketvart Maatschappiji of Amsterdam placing orders for the construction of five new steamers, of about 2,000 tons each, with accommodation for a limited number of passengers, to be used in the coasting trade of the Netherlands East Indies. The building of the vessels is divided among several Dutch firms. One of the ships, with machinery, is to be built by the Rotterdam Drydock Company, which has thereby secured employment for its last vacant berth. The hills for the other four vessels are to be built by the Internationale Scheepsbouw Maatschappij de Maas, Slikkerveer, the machinery installations for the latter having been ordered from the Fijenoord Shipbuilding and Engineering Company.

New Suction Cutter for Cochin Service

AN interesting launching took place at the latter end of March from the Renfrew Yard of Messrs. William Simons & Company, when the large cutter suction reclamation dredger *Lord Willingdon*, took the water. The dredger has been built to the order of the High Commissioner for India and is intended for service at Cochin.

The vessel, which has been constructed under the supervision of Sir J. H. Biles & Company, is designed to dredge 1,500 cubic yards per hour from depths up to 40 feet, and discharge this through a floating pipe 4,000 feet in length. The pumping outfit consists of a very large centrifugal suction and discharging pump, coupled directly to a set of triple expansion surface condensing engines.



The Type of Suction Cutter Dredger Constructed for the Cochin Service

A spiral rotary cutter is fitted on the lower end of the suction frame, and is driven by steel spur gearing from a set of compound surface condensing engines. The propelling machinery, which will give the vessel a speed of eight knots, consists of two sets of compound surface condensing engines and steam is supplied by four large, multitubular boilers working a ta pressure of 180 lbs. The vessel, which was christened by Mrs. J. B. Struthers, will proceed to Cochin under her own steam.

At the luncheon, after the launch, Mr. William Brown, chairman of the builders' company, said that his firm had built 82 vessels for India within the past 40 years, and that they had one at present under construction for the service at Vizagapatam Harbor of the Indian Government.

Mr. J. H. Biles, in replying to the toast of "The consulting Naval architests," said that the dredger was designed for cutting out a channel at Cochin. When the improvements of that harbor were completed, trading vessels would be able to enter the inner harbor at any time. The port would then be the best in the South of India, and would, it was expected, have a great deal of trade.

The sole agents in Hongkong and China for Messrs. Wm. Simons & Co., Ltd. are the Jardine Engineering Corporation, Limited.

China and the League of Nations

(*Continued from page 204*).

It is not altogether certain that even such an invitation would solve China's financial problem, as under existing circumstances it may be taken for granted that the League authorities would decline to accept the task with America outside the League, coupled with the possibility that she would refuse to cooperate. The consortium is purely an American instrument for solving China's financial troubles, called into being at the invitation of the State Department as the expression of its policy towards China typifying that limited international cooperation in its affairs which makes for the elimination of special interests and preferred positions and, incidentally America's only opportunity to participate in the building of railways. America's financial position permits her to dominate the consortium and to a large extent dictate its program. To preserve its own dignity and prestige, the League would naturally hestitate before embarking on an enterprise that conflicts with such an important feature of American policy without previous assurances from Washington that the scheme would meet with approval and support. There is a feeling in League circles that although America colaborated with the League in the financial rehabilitation of Austria and Hungary, it is highly problematical whether she would welcome the extension of the principle to China and by doing so surrender the advantage now held by the American Group in the consortium. If China persists in refusing to recognise the consortium and the League machinery cannot be used as a substitute because of the above complications, the problem of China's financial rehabilitation will have to be solved from within.

These conditions, it would seem, immeasurably strengthen China's contention that she does not require a large foreign loan if conceded the right to full fiscal autonomy and must in the end defeat all programs of international unity in politics and finance and open the road for China to exercise her sovereign powers to invite international competition in the matter of administrative and development loans. As a monopoly-in-fact, the consortium may for a time, successfully defeat this exercise of China's borrowing powers in the world's markets, but in the end it will have to surrender to the inevitable before the clamor of public opinion.

The Flood Problem of Kwangtung

By G. W. Olivecrona, Engineer-in-Chief, Board of Conservancy Works of Kwangtung

IN the following paper I wish to put before the public the Flood Problem of Kwangtung, such as it appears to the hydraulic engineer, but in such a way that the layman will also be able to grasp the purport of the problem, and to form, for himself, an idea of its magnitude. Here I will give, in a concise form, a brief statement of the condition of the rivers. This statement is based upon scientific investigations of the causes that rule the flow. I will also outline the methods that must be applied in order to control the floods.

On a stretch of coast, 60 miles in length, no less than four rivers debouch into the sea, viz, the West, the North, the Pearl, and the East Rivers, discharging during the rainy season about 2,000,000 cu. ft. of water per second.

I will begin by giving you a general brief description of the geographical and the hydrographical features of these four rivers. The Han or Swatow river, draining the extreme north-eastern part of the Kwangtung province, will not be dealt with in this context, as it forms a river system of its own, entirely separated from the four rivers under discussion.

The West River

The West River of Sikiang, with its tributaries, drains, broadly speaking, the whole province of Kwangsi, the eastern part of Yunnan, the southern part of Kweichow, but only a small part of Kwangtung, or about 1/10 of the whole province. Its drainage basin covers an area, within which could be placed the whole of Great Britain and Ireland, together with the Kingdom of Denmark.

The river is navigable, even during the dry season, as far as Wuchow, for craft having a draft not more than 6 ft.; but beyond this place only for native boats and flat-bottomed motor-boats, as several rapids form obstructions difficult to overcome. Small boats may proceed with certainty up to Hingi in Kweichow, a distance of about 530 miles from Wuchow.

A river of this magnitude naturally receives a great number of tributaries, but I will restrict myself to mention only the two largest of them, the Yuh Kiang and the Kwei Kiang. The latter, which also is called Fu Ho, has in its upper course a canal built in 214 B.C. This canal is connected with the river Siang Kiang, belonging to the Yangtze River system. Siang Kiang debouches into the Tung Ting Lake. In old days this canal was the connecting link between the Kwangtung and the Yangtze River systems, and made it possible to ship tribute rice and merchandise, inland, from Canton to Peking.

At flood time the rivers rise tremendously. During the big floods of 1915 the water at Wuchow rose 82.3-ft. above the lowest water level on record. That is to say, if we should mark this height on the Sun Company's Building on the Bund, the water would reach to the fifth floor. The average rise is about 61-ft. above the lowest low-water mark, and such floods are generally not dangerous to the dykes along the river. Still, even moderate floods may cause inundation, not by over-topping the dykes, but by washing out those dykes which are not of a sufficiently strong construction. During the year 1915, the quantity of water passing Wuchow at the highest stage was 2,100,000,000 cu. ft. per second That means, that if this quantity had been confined within the old city walls of Canton, the water would have risen, in one hour, to a height of 157-ft. above the ground, and would have entirely covered the Sincere Building. I will give another example. If the river had, at that time, been led into the Shuntak district, and that district had been surrounded by a wall, 13-ft. in height, this basin would have been filled up to the top of the wall in 24 hours. The highest rise in 24 hours at Wuchow was 22-ft. during the summer flood of 1924.

The North River

The North River, or Pei Kiang, is next in size to the West River, but comparatively a small one, having a drainage area of only 1/7 of that for the West River. The North River also has a great number of tributaries. The most important of them are the Wushui, the Yungkiang, the Linchowkiang, and the Sui Kong or Bamboo River. This river rises in the northern part of the province, having its sources on the southern slopes of the Meiling range, which latter separates the Kwangtung and Kwangsi provinces.

The North River is in communication with the Canton River through the Lupao Channel, the Sainam Channel, the Fatshan Channel, and, south of the latter, through several channels above and below Chanchuen. It is only during the flood season that water flows from the Lupao and Sainam channels to the Canton River. Sandbanks formed in their openings cut off water communications during the dry season. In the other channels the water flows both ways, according to the ebb and flood in the sea.

The North and the West Rivers are in permanent communication through the Junction Channel at Samshui. Any variation of flow in the one river, therefore, exercises a certain influence upon the flow in the other. During the wet season the West River is the dominating one, and the water flows from that river into the other; but in the dry season the reverse frequently occurs so that the water in the North River goes into the West River.

The Pearl River

The Pearl River, or Chu Kiang, is only a small river, compared with other rivers of Kwangtung province. It may even be open to question whether the Pearl River, should be considered as an independent river at all, or only as a branch of the North River. Furthermore, it has more the character of a tidal channel than that of a river proper. A study of the map gives the impression, that the river is principally fed from the North River, and also, via the Samshui junction, from the West River. This is, indeed, the fact during the wet season. In the dry season the Canton River drains the country situated between the basins of the North and East Rivers, and has the character of an independent river.

The East River

The East River, or Tung Kiang, forms a water system of its own, entirely separated from, and independent of, the other systems. It drains the land to the East of the Canton-Kowloon railway and comes from the mountains on the boundaries of Kwangtung, Kiangsi, and Fukien.

All these four rivers have together built up the Canton Delta, a vast plain of alluvial soil which covers an area of about 3,100 sq. miles, situated to the South of Canton and to the West of Sheklung. This area has a population of 8,000,000 to 10,000,000 people.

The Delta

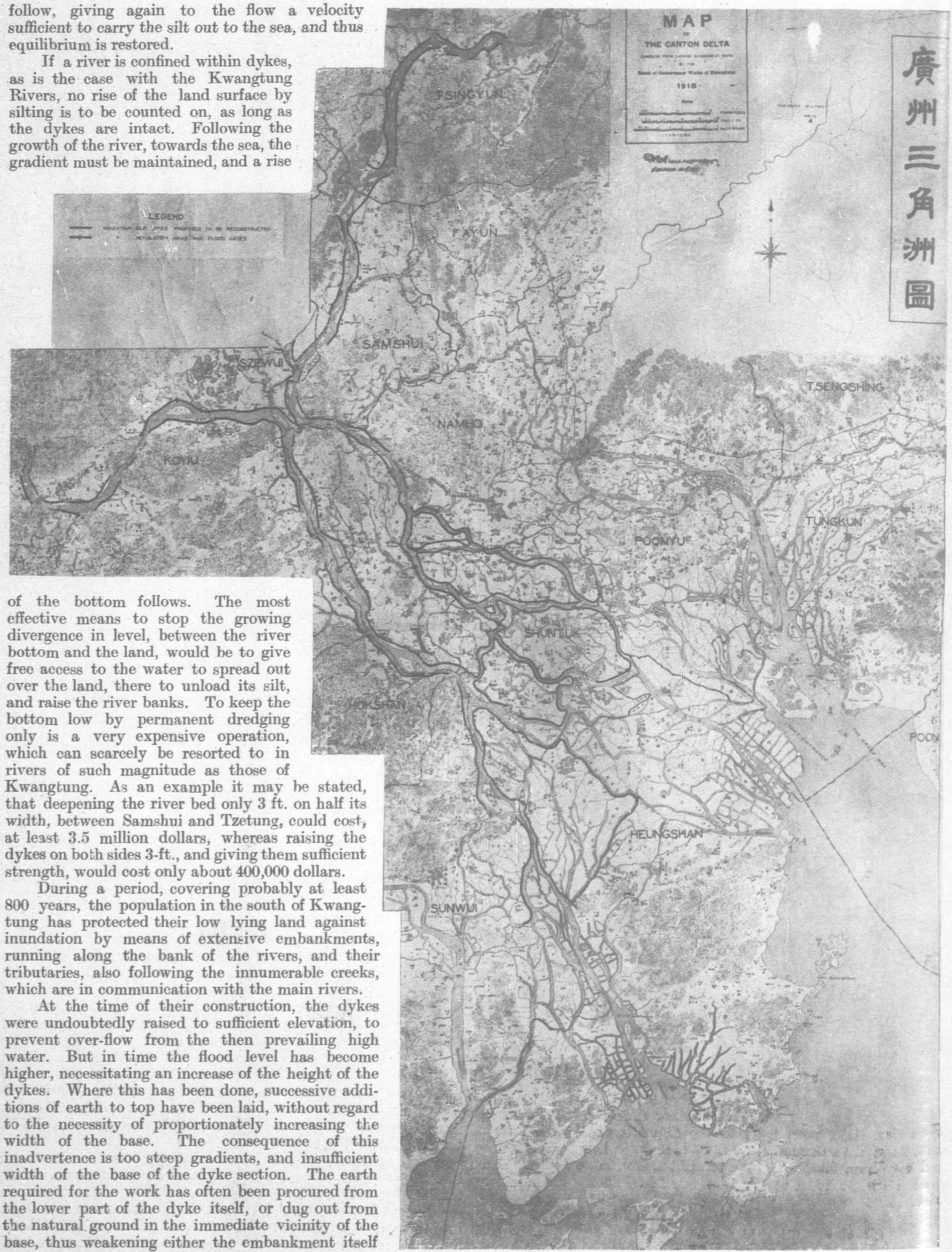
The Delta is penetrated by an immense number of channels, formed partly by nature, and partly by man, and in places dotted with isolated mountains. In ancient times, these mountains evidently formed parts of the archipelago, which surrounded the continent. In prehistoric times the seashore seems to have reached as far as the Ling Yang Gorge, forming a large bay where now the Kwangli enclosure lies, and extending to the White Cloud Mountains north of Canton. In this bay the West and North Rivers meandered between the islands out to the open sea, depositing their silt, and successively building up the plains now known as the Canton Delta. Simultaneously the East River approached from the East, building up land in the same way.

Every alluvial river is bound to extend its delta further out into the sea, as long as the littoral currents do not prevent its extension, by carrying the silt laden river-waters out to the deep sea. The West and North Rivers debouch through several channels into the sea, where the silt settles along the coast. Year after year the settling continues, resulting in an extension of the river-bottom outwards. As the riverbed is thus extended, the slope of the river becomes more gentle, causing a slacking of the current, and silting of the bed further up the river. A rise in water level is then bound to follow, giving again to the flow a velocity sufficient to carry the silt out to the sea, and thus equilibrium is restored.

If a river is confined within dykes, as is the case with the Kwangtung Rivers, no rise of the land surface by silting is to be counted on, as long as the dykes are intact. Following the growth of the river, towards the sea, the gradient must be maintained, and a rise of the bottom follows. The most effective means to stop the growing divergence in level, between the river bottom and the land, would be to give free access to the water to spread out over the land, there to unload its silt, and raise the river banks. To keep the bottom low by permanent dredging only is a very expensive operation, which can scarcely be resorted to in rivers of such magnitude as those of Kwangtung. As an example it may be stated, that deepening the river bed only 3 ft. on half its width, between Samshui and Tzetung, could cost, at least 3.5 million dollars, whereas raising the dykes on both sides 3-ft., and giving them sufficient strength, would cost only about 400,000 dollars.

During a period, covering probably at least 800 years, the population in the south of Kwangtung has protected their low lying land against inundation by means of extensive embankments, running along the bank of the rivers, and their tributaries, also following the innumerable creeks, which are in communication with the main rivers.

At the time of their construction, the dykes were undoubtedly raised to sufficient elevation, to prevent over-flow from the then prevailing high water. But in time the flood level has become higher, necessitating an increase of the height of the dykes. Where this has been done, successive additions of earth to top have been laid, without regard to the necessity of proportionately increasing the width of the base. The consequence of this inadvertence is too steep gradients, and insufficient width of the base of the dyke section. The earth required for the work has often been procured from the lower part of the dyke itself, or dug out from the natural ground in the immediate vicinity of the base, thus weakening either the embankment itself or the foundation upon which it rests. For years this procedure has been carried on, and considerable quantities of earth have been removed from the lower part of the dyke to its top. The result is that the top width, as a general rule, has now become unnecessarily large as compared with that of the base.



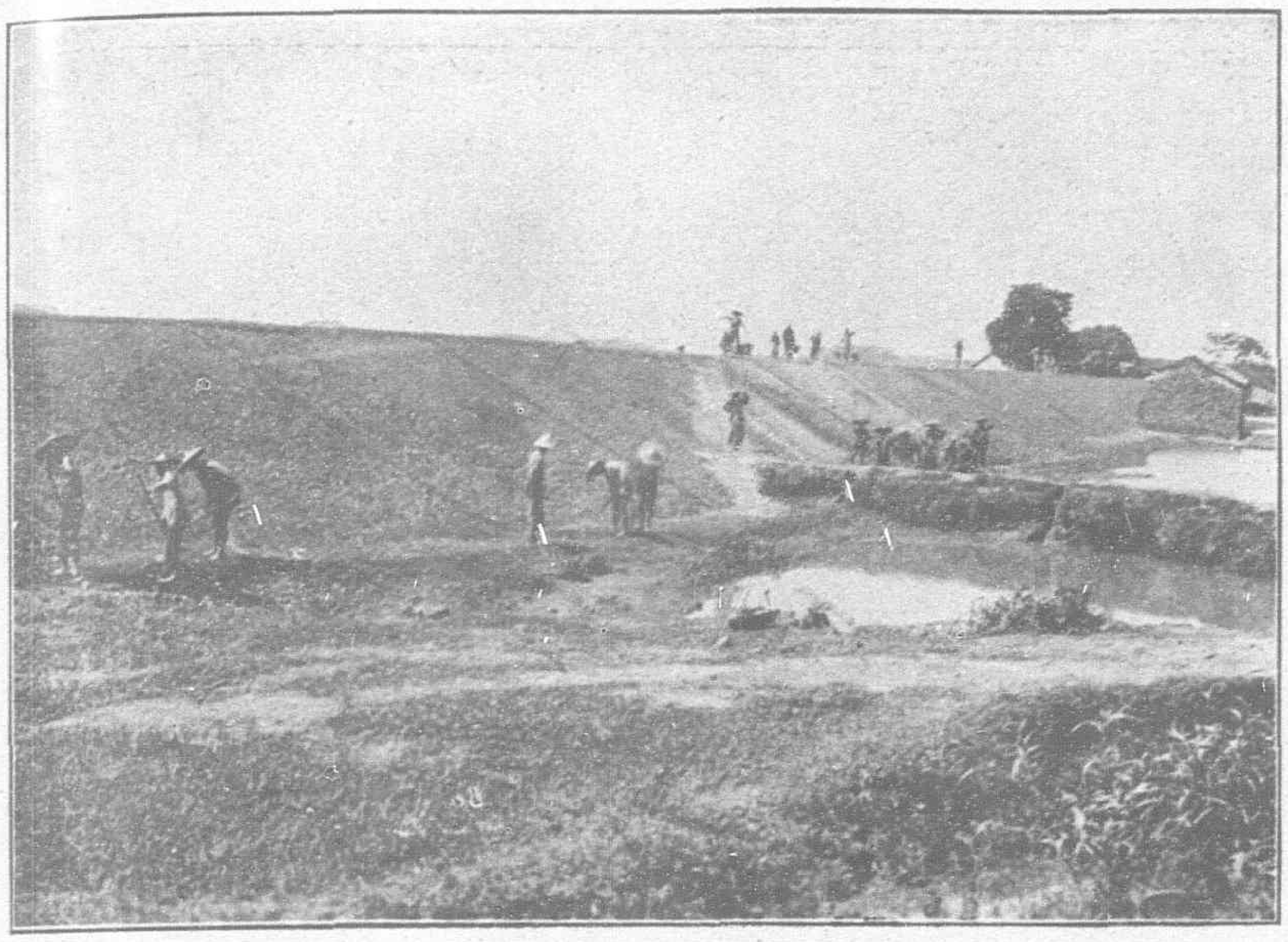


Fig. 1.—A Reconstructed Dyke, East River

Where the material for repairs has been taken from the ground near the dyke on the landside, more or less deep excavations now remain, being of considerable width and running parallel to the dyke. It is evident that if a part of the soil on the landside, close to the base, is taken away, the load which has to counterbalance the balance the water pressure on the riverside is decreased. In this case resistance of the foundation is weakened, and the danger of undermining arises. This phenomenon has been of common occurrence during recent floods.

The erection of houses on the tops and slopes of dykes is a common practice among the people and should be condemned. The excavation for driving of piles for foundations weakens the dykes, and the presence of the buildings interferes with proper inspection and repairs. The probable reason for building on the dykes is the desire to be near the river as a water supply. But it would pay in the end to move the houses further inland to higher ground, and construct an artificial water supply, rather than to run the risk of having them spoiled by floods year after year.

Another circumstance which causes serious damage to the dyke is the custom of laying the slopes under cultivation. As the durability of an earth-embankment depends on the protection given to its slopes, this durability is imperiled as soon as the cover is injured or taken away. The yearly ploughing of the slopes spoils the cover and exposes the soil to the erosion of the heavy summer rains.

But not content with the use of the dyke-slopes for agricultural purposes, the country people do not hesitate to carry on excavations in the dyke body itself in order to gain a few additional square feet of land for their adjacent rice-fields.

In other words, the dykes seem to be considered as " no man's land," which every one has the right to use for his own selfish purposes, instead of being looked upon as the common property of the whole population, for the safety of whose life they are provided.

It is not sufficient to construct a dyke, however strong, if the future upkeep is neglected and damage left without immediate attention. A cut out of the slope, which at the beginning may be of inconsiderable dimension, increases in the course of time, until the strength of the construction is so diminished that, when the floods occur, a catastrophe is certain to happen. The strength of a dyke system is determined by its weakest and lowest section, and it is useless to give to one part of it a strength which is not shared by the rest.

There are, it is true, committees for every dyke district, formed by delegates from the different communities within the protected area, whose function it is to supervise and carry out necessary repairs. In most cases these committees have no aptitude for dealing in a thorough way with the problems which arise, and their oversight is limited to only their part of the dyke-system. The dyke is like a chain; if one link breaks the chain fails to do its duty. Consequently, a district surrounded by a continuous embankment, on whose solidity and maintenance the safety of the whole enclosed area depends, is often kept under supervision by several committees, each working in its own interests, without any co-operation whatever. The result is, that one part of the embankment may be well kept up, while another is left to its fate, one committee being well supplied and the other ill supplied with funds.

It seems, therefore that one homogeneous organization, with sufficient power, independent of local influence, and possessing the requisite qualifications to overcome technical obstacles, is the only suitable corporation to conduct the dyke supervision.

I have now given you a general conception of the condition of the rivers, and of the means which have hitherto been applied in trying to confine the floods to the river-bed. We will now investigate if there are any other ways to prevent the flooding of the low lying country. The principal means suggested as remedies against the violating floods may be classified as follows :—

1. Afforestation of the drainage basin.
2. Creating new outlets to the sea.
2. Storing the floods in reservoirs.
4. Cutting off bends and dredging of the river-bed.

I will examine the effectiveness of each of these means in their proper turn, and also state their influence upon the floods, if applied on the Kwangtung Rivers.

Afforestation of the Drainage Basin

There exists in the public mind an impression that the prime cause of the floods has been the destruction of forests in the river valleys, and that the surest way to prevent them is by reforestation This conception is held not only by laymen, but also has been advocated by hydraulic engineers, though more as a matter of theory than founded on actual observations. Recent investigations, based on facts collected during a long sequence of years, have so far, in a measure, changed this conception amongst the experts on hydraulics. Still there is a great diversity of opinion on the subject, some maintaining that the cutting down of forests will ultimately convert a country into a desert, while others claim that a moderate cutting down of the forest even increases the rainfall.

The fact remains that in Europe as well as in America remarkable series of great floods, in land covered with woods, have not occurred more frequently *after* the forests were cut down. It is also argued by some, that with reforestation, if the floods occasionally were high, they would not be as frequent. However, where long periods of records are available, they do not always verify this apprehension.

It is generally accepted by both sides that the leaves falling from forest trees, as they decay, form a humus which has a capacity to absorb water. However, after this capacity is utilised, a con-

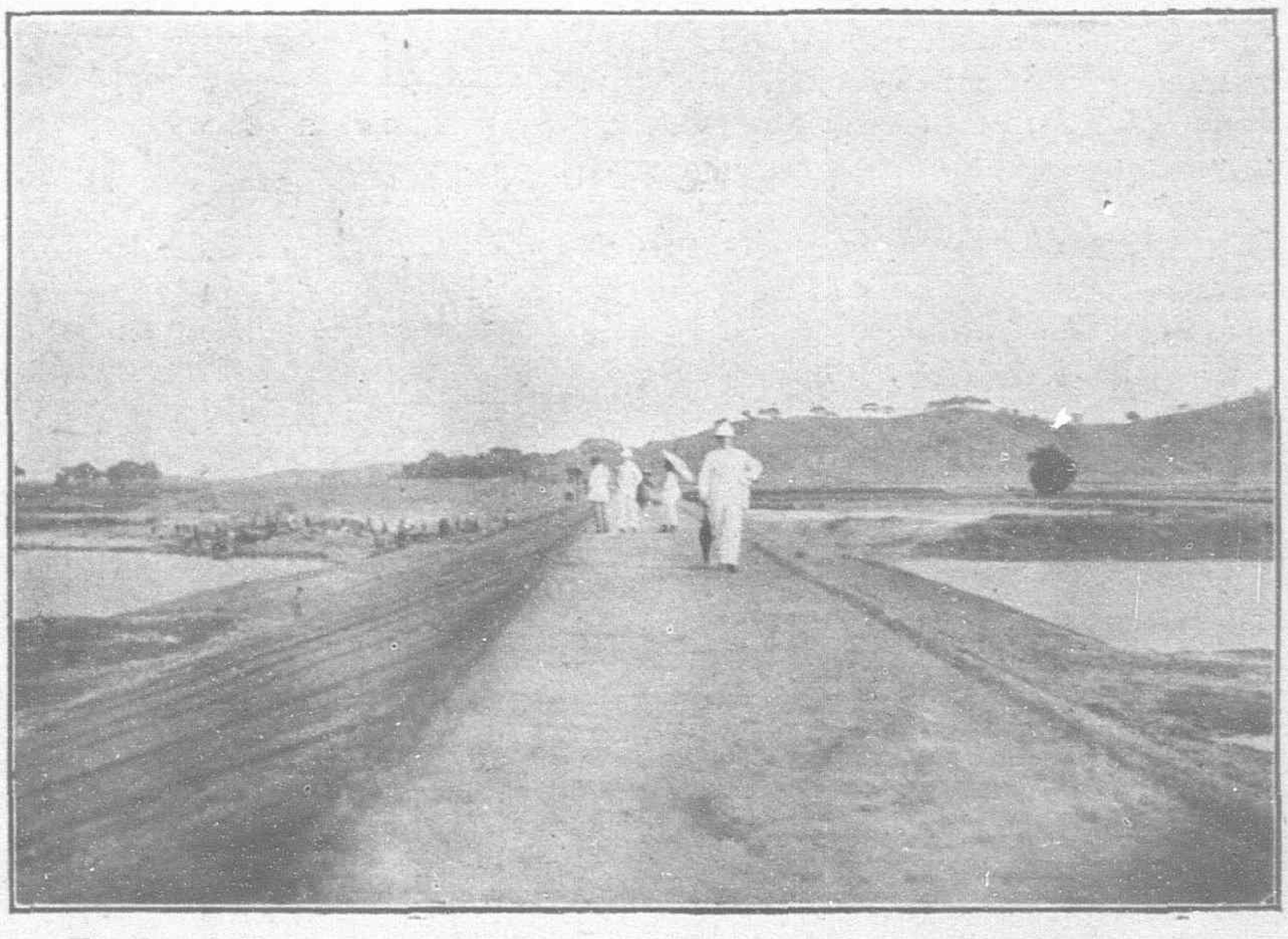


Fig. 2.—A Reconstructed Dyke Being Inspected by the Engineer-in-chief

dition which soon will arrive in countries subject to heavy rainfalls at short intervals, the regarding influence of humus on the run-off is more or less lost. It will require tens of years to produce a good forest growth within the drainage basin of a river. After that half a century will probably be required for the leaves to decay in sufficient quantities to produce a layer of humus thick enough to absorb the rainfall.

Under the assumption that reforestation would reduce the flood discharge of a stream to one-half, I have made an estimation of the forested area that would be required to lower the flood heights in the North River to an elevation of 1 foot below the present dyke crests at Tsingyun. I have found that at least 65 per cent. of the total drainage basin, amounting to about 12,000 sq. miles, would have to be covered with forest to bring about such effect. Even with best organization, and unlimited resources, it is doubtful if the government or the communities would be able to inaugurate such a scheme.

The following illustrates what happens when a heavy downpour drenches a wood land. If we take a piece of blotting paper and place it on a glass square, and give to that square an inclination, and then pour water over the blotting paper, the water will be absorbed by the paper and be prevented from flowing down the glass square for a certain period of time; but, when the paper has exhausted its capacity to absorb more water, the surplus water will begin to flow down the square as freely as if no blotting paper were there at all. This illustrates what happens in nature when heavy precipitations discharge over a mountainous country covered with vegetation.

From another point of view afforestation would play a part in the future regime of the river. Through lack of cover by vegetation, the mountains are now freely exposed to erosion, and, besides, their surfaces are brought to a state of decomposition. Heavy showers, which are frequent in these regions, carry quantities of decomposed matter down into the river valleys, and this accounts for the silt deposits met with in their lower courses. A scheme of afforestation on the mountain slopes in the vicinity of the rivers would keep the soil in place and would be justified for that purpose only. But a much more important circumstance to be considered is the general economical benefit for the whole country, derived from forest cultivation. This speaks in favour of the adoption of an afforestation scheme throughout the drainage basins, worked in a scientific way and supported by the authorities as well as by the country people themselves.

As the only, immediate, or principal remedy against floods, afforestation is not to be recommended.

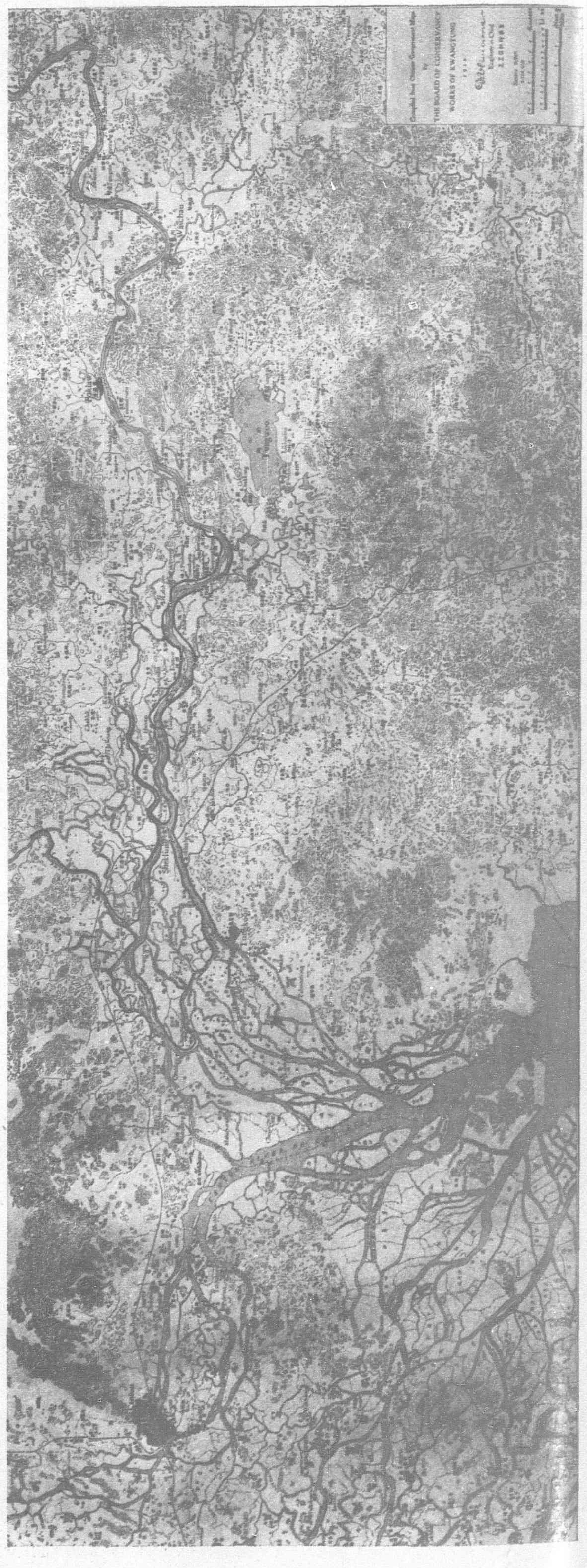
Creating New Outlets to the Sea

A scheme which has been much ventilated among laymen is that of creating an additional outlet for the West River, either to the Tongkong creating an additional outlet for the West River, either to the Tongking Gulf or the South China Sea. In the first case, an outlet for the main river should be sought for between Wuchow and Sunchow or, for the Yuh Kiang, between the latter place and Nanning. In the second case, an outlet to the sea from any suitable point between Wuchow and the Ling Yang Gorge would have to be constructed.

The West River valley, above Ling Yang Gorge as far as the junction of Yuh Kiang, is separated from the sea coast by huge mountain ranges, their main direction being from East to West, with a number of branches stretching to the North and to the South.

The Yuh Kiang valley is in a similar way isolated from the coast of Tongking Bay. The branch mountains sometimes form between them gently declining valleys, those sloping to the North being separated from those sloping to the South by an apparently low saddle, which, for the layman seem to be easy enough to overcome, but, when inspected by the engineer, form unsurmountable obstacles for the construction of canals.

A study of available maps, and the general geographical conditions of the country, together with information collected from different sources, led to the conclusion that an attempt to cut through the watershed to the south would prove impossible. Nevertheless, investigations have been undertaken with the principal object of eliminating this scheme once for all.



Lower Course of the East River

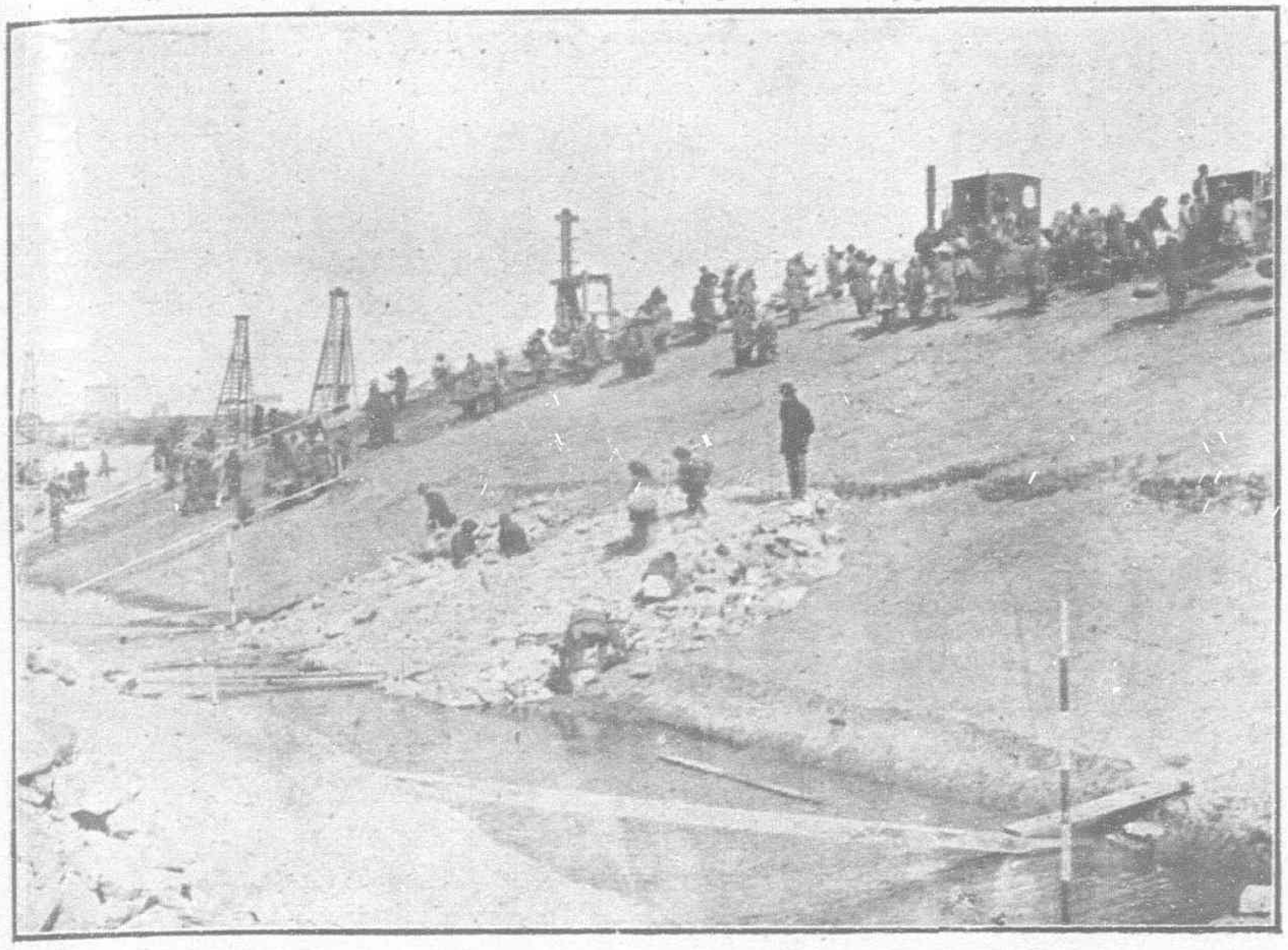


Fig. 3.—Stone Pitching on Dyke Slope, North River

No less than six different passes in the mountain ranges south of the West River have been examined, between Nanning and the Ling Yang Gorge, in order to ascertain if any possibilities exist to cut a canal big enough to lead off sufficient water, in order to prevent overtopping of the present dyke systems. Not in one single instance did the topographical aspect warrant such a possibility, and I am positive in my opinion that the idea of creating a flood discharge from any point between these places to the open sea, through a canal, must be entirely and finally abandoned.

Storing The Flood In Reservoirs

The plan of controlling the floods by means of reservoirs, in which part of the water is held back during the flood season, again to be released at a lower stage in the river, appears to have met with much popular approval. To the hydraulic engineer, this way of controlling floods is no novelty; its advantages have been thoroughly studied and its limitations are also well known. The very function of reservoirs, that of filling, holding, and emptying their supply of water as required, abstractly renders them particularly adapted to serve to reduce the natural fluctuations in the volume of rivers. This influence is similar in kind to that of natural lakes, but is theoretically even more effective, because the release of the water of a reservoir is wholly under control, while that of lakes is relatively unrestrained. But there are two practical considerations which limit their employment; these are, the storage capacity required for efficiency, and the ever present question of cost. Only where the natural conditions are favourable can the reservoir system for preventing floods be adapted with advantage. As its value rapidly diminishes with distance, it must be close to the locality which is to be benefited.

Generally from a constructive point of view, the best sites for reservoirs are found in the upper courses of the river system, and consequently the run-off in that part of the drainage basin only is regulated by the reservoir. The rest of the basin, in most case the larger part of it, continues as before to feed the river, and the beneficial influence of the storage in the upper courses is only slight in the lower ones. Great floods do not arise from average conditions, but from exceptional variations, such as are caused by a series of heavy rains, rapidly succeeding each other. Each rainstorm produces in the river a flood, the volume of which may be absorbed by a reservoir or a system of them. Should a second storm sweep over the valley, a short time after the first, the reservoirs to be effective must be emptied, or their capacity doubled. To hold all the excess rainfall until low water, would require reservoirs of enormous capacity. Therefore, as soon as a reservoir is filled, and has for the time played its part as a reducer of floods, it should be emptied in order to utilize the same space for a second rainfall. While reducing the flood crest at a given locality, the reservoir necessarily prolongs the period during which the river remains at a high stage. This condition is not desirable from an agricultural point of view, as it prevents the drainage of the lowland in the lower region of the river. A high but short flood may be preferable.

In rivers carrying much sediment during floods, reservoirs always run the danger of being silted, and thus losing part of their storing capacity. This is naturally a slow process, but it has to be taken into consideration when the advantages and disadvantages of reservoir systems are compared.

The prospect for introducing reservoirs along the course of the Kwangtung Rivers, as a preventive against inundation of the plains, is not especially encouraging. No site for a reservoir can be found below the gorges, without encroaching upon the rights of the rural population, by putting large and valuable cultivated regions under water. Above the gorges the land is less valuable, but here the valley of the rivers and its tributaries are generally so narrow, and of such steep gradient, that the construction of reservoirs of sufficient capacity is scarcely possible. Let us, however, for arguement's sake presume that this is possible for the North River, and that we wish to store so much water as to keep the water level 1 foot below the crest of the dykes in the Tsingyun region. This means at least a reduction in flood height of 5 feet below the high-water level of 1915, which is the highest observed. It would then be necessary to store at least 23,800 million cu. ft. of water to gain the desired reduction at Tsingyun. A reservoir of that capacity would, if filled say to a height of 16 feet, cover an area of 52 sq. miles or 236,000 mao. Storing this volume would not poduce a lowering of the flood height at Lupao of more than about 2.3 feet, and still less further down.

Independent of the success or failure of introducing reservoirs, the dykes in the lower course of the river must still remain as a defense against inundation, since we must keep in mind the fact that only a slight lowering of the extreme flood height would be attained by storing.

Cutting off Bends and Dredging of The River Beds

A method suggested for reducing flood height is the straightening of the river by means of cut-offs. It is believed, that by cutting off one or several bends, the discharge of water will increase at such a rate, as to produce a lowering of the flood level in general. Theoretically, an acceleration of the flow will follow, since shortening of the river gives to it a steeper slope. This change of condition, however, will only result in a lower flood level immediately above, and in the upper end of the cutting, while, at the lower end, an increase in flood height will take place, because the water rushes through the improved section much faster than the lower part is able to carry it off. The fact is, that cut-offs have been repeatedly

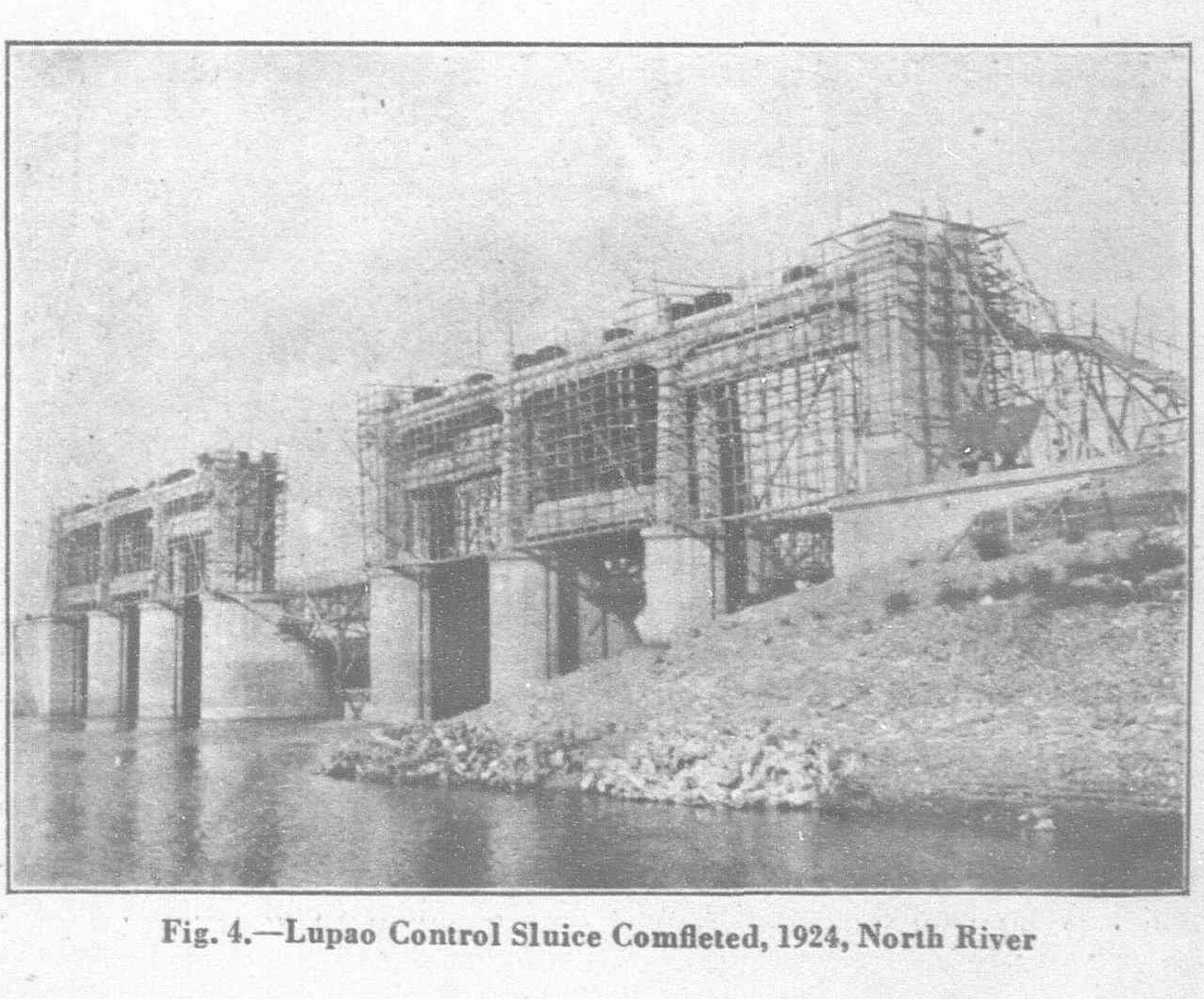


Fig. 4.—Lupao Control Sluice Comfleted, 1924, North River

tried in rivers as a means of reducing floods, but generally with unsatisfactory result. They afford relief in one locality, but only at the expense of other localities. Cut-offs are justified in case a higher flood level does not cause any inconvenience to the surrounding lands at the lower end, and even then, only when the benefit derived balances the cost of the construction of the canal. For shipping purposes, on the contrary, the straightening of a river may be in many cases advantageous.

Dredging of the river bed has often been held forth as the only means that would lower the flood level. And so it would, if only the once dredged canal remained open. This is, however, not to be expected in a silt-carrying steam for the following reason. By dredging the bottom, the cross section of the bed is made larger than before, which causes a slackening of the current velocity. This being a fact, the current is not strong enough to keep the silt suspended. It settles, and the dredged canal is soon silted again. No improvement can be obtained unless dredging operations are carried on perpetually. Such work would, in order to exercise any effect on the flood heights, reach a magnitude and involve such tremendous yearly outlays, that for economical reasons the method is not justified. It is, furthermore, not sufficient to dredge away a shoal here and there, expecting that such local operations will lower the floods in general. The bottom, along its whole length, must be lowered from the mouth as far up the river as to where improvement is desired. Now, there are other means to keep the current in a dredged canal at such a speed that the silt is prevented from settling, namely the restriction of the width of the river bed by the help of cribwork and correctly located dyke systems. It is a false supposition that the lowering of the river bottom, say one foot, must effect the same lowering of the water level. The height of the water surface in a river depends, in its lower course, upon the height of the water level at its mouth, which in case of the Kwangtung Rivers is the sea level; and no human being can change that.

Experiences all over the world show that the lowering of flood heights is not obtainable, within reasonable costs, by dredging the bottom, though for navigation purposes it is often resorted to in silt carrying rivers.

Summary

Summing up what has been said, it is obvious that: firstly, reforestation, as a means of lowering the present floods, is not to be relied upon, but would, even if it should have some influence on the flow, postpone the salvation of the country for an indefinite period of time; secondly, that creating new outlets to the sea is out of the question; thirdly, that reservoirs, even if possible to construct, would only give a very slight relief from floods, and would in time lose their storing capacity on account of silting; and fourthly, that cut-offs and dredging of the river bottom, though advisable in some instances, would not alone be effective in lowering the water to a level that would give permanent security against overflow of tha present dykes.

The previous investigations show that an improvement of the general flood conditions, falling within limits of available resource, cannot be derived from efforts to reduce the high water level. The remaining means to be taken into consideration agree with the conception of previous generations that an effective system of dykes bordering the main river as well as the tributaries and channels, where adjoined by low-lying land, thus confining the floods within stable limits, would give the protection needed against inundation.

Proposals of the Board of Conservancy Works

I will now give you a short description of the principal feature of the work which has been proposed by the Board of Conservancy Works in order to prevent the yearly recurring flooding of the river valleys and delta.

The present dyke systems along the main rivers should be strengthened by substantial earthfill, and protected on the river side against scouring. Their height should be increased to a level reaching at least 3 feet above the expected highest waterlevel. The highest waterlevel shall be determined with the assumption that the river carries its total maximum discharge between the embankments. Where no dykes exist, new ones should be constructed. Creeks and channels now breaking off the continuity in the dyke systems should be closed, the smaller ones by ordinary flood gates, permanently shut during flood time; the large ones by movable dams, which will permit the regulation of flow in these channels. By thus confining the floods to the main rivers, an immense length of dykes, which now border the innumerable branch channels, will be superfluous. It must be borne in mind that these dykes, penetrating far the interior, must, as conditions are at present, be constructed to the same height and strength as the dykes along the main river. In cases where these dykes should be necessary to maintain, as for instance along a channel in which the flow is restricted by a movable dam, they do not need to have the same height as the main dykes, but could be of a much cheaper structure. In other words, they would become of only secondary importance, and would be needed only for local purposes.

Concentrating the flow in a few channels will naturally increase its velocity, but this would only be an advantage. The silting would decrease, and the river bottom be lowered by scouring.

Following the course of the West River, the first dyke system met with is above Shiuhing. The dykes on both shores are reconstructed on the whole length down to Motomun, and the necessary flood gates and regulation dams erected. In the Delta a number of channels should be permanently closed by embankments.

The same principle is applied to the North and East Rivers.

Regarding the Pearl River dykes, their upkeep will become a purely local affair, as the proposed regulation dams at Lupao, Sainam, and Shahow will make possible such reduction of the flow that no danger of flooding is expected.

It is evident that the closing up of several channels during flood time is objectionable if looked upon from the interests of the shipping; but this nuisance would only last for a short period every Fear. The salvation of the people from the frequent inundation must carry more weight than a few weeks' inconvenience in transportation. Secure to the people favourable conditions of life, and means will be found to satisfy other needs.

Finally, a few words regarding the cost that would be involved in the completion of the scheme.

The West River work would cost	.. H.K.	$19,500,000
,, North ,, ,, ,, ,,	.. ,,	$10,900,000
,, East ,, ,, ,, ,,	.. ,,	$ 4,600,000
	H.K.	$35,000,000

The total area that would be saved extends from Siusang Gorge in the West to Poklow in the East, and from Feloi Gorge in the North to Heungshan in the South.

The cost for eliminating the danger would amount to, in round figures, $4.60 per mow of cultivated land. Considering that one ricecrop represents a value of $25 to $30 per mow, a cost for necessary protection work of $4.60 is insignificent. I have estimated the time for completion of the scheme at fifteen years, during which time the farmers consequently should have to pay 30 cents per year a mow for flood protection work. Keeping in mind the losses inflicted by one single flood, as for instance the flood of 1915, when according to a very moderate estimation, property up to ten million dollars was destroyed, the population would, no doubt, take upon themselves the responsibility of paying a tax, provided guarantees were given that the tax would be efficiently and well spent for the purposes intended.

It is to be hoped that the leading corporations and men in this Province will have their eyes opened to the deplorable state into which the country has sunk through lack of efficient dyke maintenance, and will be made to understand the true bearing of the flood problem. What I have stated in this paper as to the condition of the rivers and their protection works are facts which cannot be denied, and the proposed remedy is based on sound technical suppositions. If I have been able to convince the public of the necessity of immediate steps being taken to straighten what has gone wrong, the purpose of this paper has been attained.*

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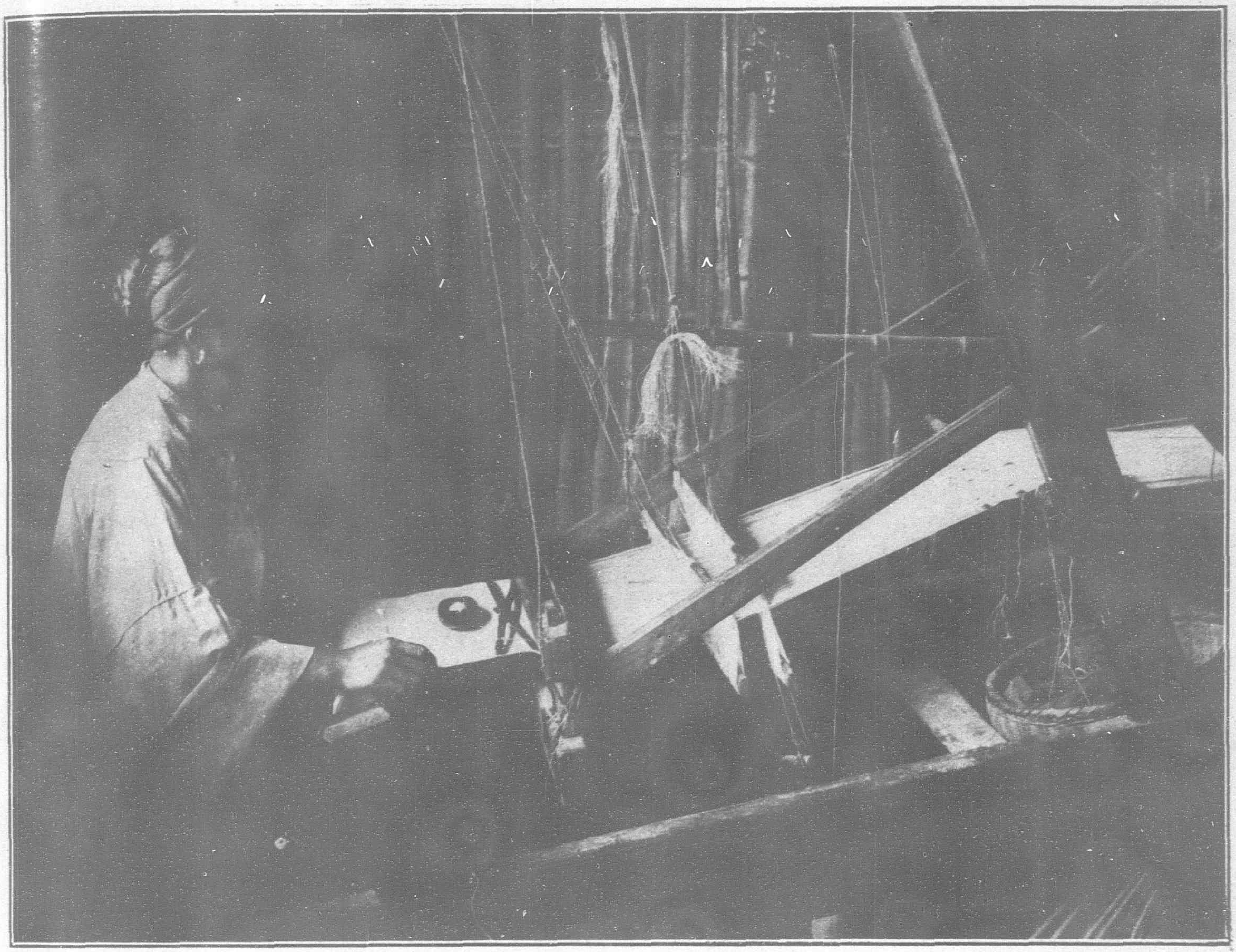
* Published in the Lingnaam Agricultural Review by the Canton Christian College.



In Spite of Modern Cotton Mills and the Imports from Abroad, Thousands of Yards of Cloth are Woven every Winter in the Chinese Homes

Oriental Cottage Industries Employ Large Numbers

Emmett A. Chapman, Far Eastern Division

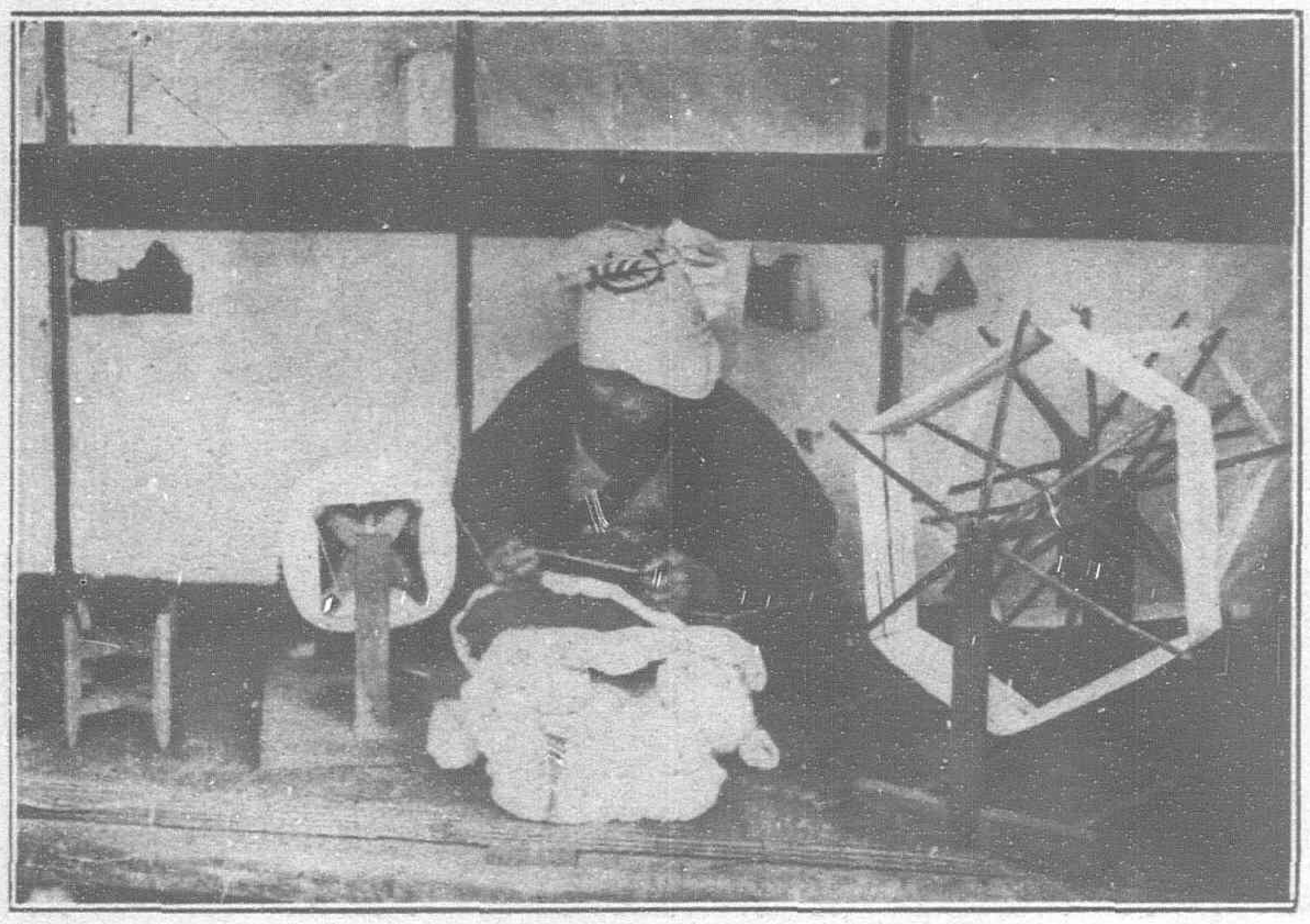
LIVING as we do in the midst of an advanced industrial era, in which power machinery is utilized to the fullest extent, the importance of home industries and the part they play in the economic welfare of certain countries is often overlooked. Millions of workers throughout the world are still engaged in manufacturing certain classes of articles in their homes. In some sections, through government encouragement and the influence of other agencies, cottage industries appear to be expanding. In others, owing to the encroachment of factories and the wider distribution of transportation facilities which make back-country sections more readily accessible, factory-made articles are superseding the output of the home craftsman.

Notwithstanding the rapid advancement of modern industry there is hardly a country where cottage industries are not found in one form or another. Even in the United States, where the power-machinery system of manufacture has been developed to a high degree, homemade articles of certain types—such as furniture and baskets—are still produced.

It is, however, in countries like China, Japan, and India, with their large populations, and in such isolated areas as Afghanistan, Nepal, Bhutan, and Tibet, where modern transportation is practically unknown, that the cottage industry from an integral part of the country's economic structure.

Cottage Industries of Japan Flourishing

Cottage industries in Japan continue to prosper even though the country has shown rapid industrial progress during recent years. Large quantities of straw matting, for example, are still made in the homes or small shops. Contractors who secure orders for a particular pattern distribute the work to the home workers, supplying them with designs and specifications as well as straw and other material. When the work is finished it is gathered up by these contractors, who pay for the labor either in money of raw materials. This cooperative form of home industry enables the workers to turn out large quantities of goods which are more or less standard in quality and design, and permits of large-scale



The Cottage Spinner in Japan

The Home Potter Still Moulds Things of Beauty

operation, particularly in the export market. Other products, such as paper, fans, toys, lacquer work, potteries, fireworks, paper lanterns, and many other articles for home consumption as well as for export, are handled in the same manner.

Chinese Home Manufactures Predominate

In China cottage industries are of tremendous importance due to the nature of the country's development and the lack of adequate transportation in certain parts, which makes deep interior points more or less inaccessible to industrial centers. Until recent years, when the hair-net and Mah jongg industries reached such importance that factory systems in the production of these products developed, practically the whole output of such articles came from individual workshops in the homes. Now, that the demand for them has declined, factories are closing and the industries are reverting to the cottage system.

Rolling Straw in China

Other items of importance in China's domestic and foreign trade, such as fireworks, potteries, fans, papers, carved woods, mystery boxes, and jewelry, are also produced largely in the homes and small shops.

Batik Featured in Netherlands East Indies

The Netherlands East Indies produces by the cottage industry method the world-famous batik or glorified cotton cloth. Cloth used in this industry is imported and distributed in small pieces to the workers, who dye it with an elaborate hand process which produces beautiful and intricate designs. As many as 100 operations are sometimes required before a single piece of cloth is finished. Native batik is now meeting with competition from imported printed cloth.

Siam, in its home industries, produces large quantities of gold jewelry with the gold leaf that is taken in exchange for its rice.

Telephone Progress in China

A contract for the installation of a long distance telephone system was entered into between the Tientsin-Pukow Railway Administration and a French firm early in July, 1925, and was approved in August of the same year by the Ministry of Communications. The estimated cost of materials required for the installation amounted to $916,300 (Gold), and was to be paid by the Administration in instalments. In August and September, 1925, a sum of $439,824 dollars (Gold) was paid to the firm. Principally due to sharp decreases in revenue, the Administration was unable to pay the third instalment of $70,192,20 when it became due, but it asked the Ministry to make arrangements with the post office authorities to advance every month as from December last a sum of $15,000 (Chinese Currency) from their receipts to the Banque de L'Indo-Chine in Tientsin until the traffic of the line had been fully restored. This was done. Work on the Nanking and Changchow section of the system was scheduled to commence on October 9, 1925, but owing to local disturbances, actual operation has been delayed. At present, all the materials have arrived in Shanghai, and are lying on the wharfs there. As soon as the hositilities on the Tientsin-Pukow line cease, work is expected to be continued without further delay.

The Hangchow Telephone Administration which was started toward the end of the Manchu regime with a capital of between $20,000 and $30,000, is in a prosperous condition. The present system extends to Hushih and Kungshenkiao on the north, Chakow and Nansingkiao on the south, Chienkiao on the east, and the West Lake on the west. There are at present some 1,400 subscribers, including a large number of government and public organs and shops. The charge for the use of a telephone is $6.50 a month for government or public organs or shops, and $5 a month for private houses, plus $20 for installation at a distance within five *li* of the central office. On the average charge of $6 a month per subscriber, the monthly receipts would amount to $8,400, or about $100,000 per year.

Dairen, the Second Port in China

Of the foreign trade of the 45 ports coming under the jurisdiction of the Chinese Maritime Customs, Shanghai, Hankow, Tientsin, Canton and Dairen monopolise from 80 to 90 per cent. With the exception of Dairen, they have progressed at a steadily increasing rate. But Dairen has forged ahead much above the general rate of advance, and has outstripped several of the other ports in the race for trade. In 1916, Shanghai, Hankow, Tientsin, Canton and Dairen occupied, in order of their importance, first, second, third, fourth and fifth places; but in 1917, Dairen had displaced Canton for fourth place. In 1918, Tientsin was displaced, making Dairen's position third to Shanghai and Hankow. Then it overtook Hankow and is now second among China's foreign trade centers. In 1915, the total of imports and exports through this port amounted to 2,270,036 tons, but, in 1924, it rose to the figure 5,562,941 tons, showing more than 100 per cent. increase. The following figures give the tonnage of its trade from 1915 to 1924.

1915 ..	.. 2,270,063	1920 ..	.. 4,038,851
1916 ..	.. 2,331,446	1921 ..	.. 4,014,718
1917 ..	.. 2,988,856	1922 ..	.. 4,799,047
1918 ..	.. 3,447,699	1923 ..	.. 5,219,649
1919 ..	.. 4,223,775	1924 ..	.. 5,562,941

Dairen has now more than 1,170 business firms. For the promotion of their mutual interests, various trades have their own organizations, such as the Manchuria Staple Produce Exporters' Association, the Cereal and Foodstuffs Association the Dairen Drug Association and the Dairen Chamber of Commerce. The associations have their own research and investigation organs. The public markets established by the Chinese and the Japanese have also prospered exceedingly.

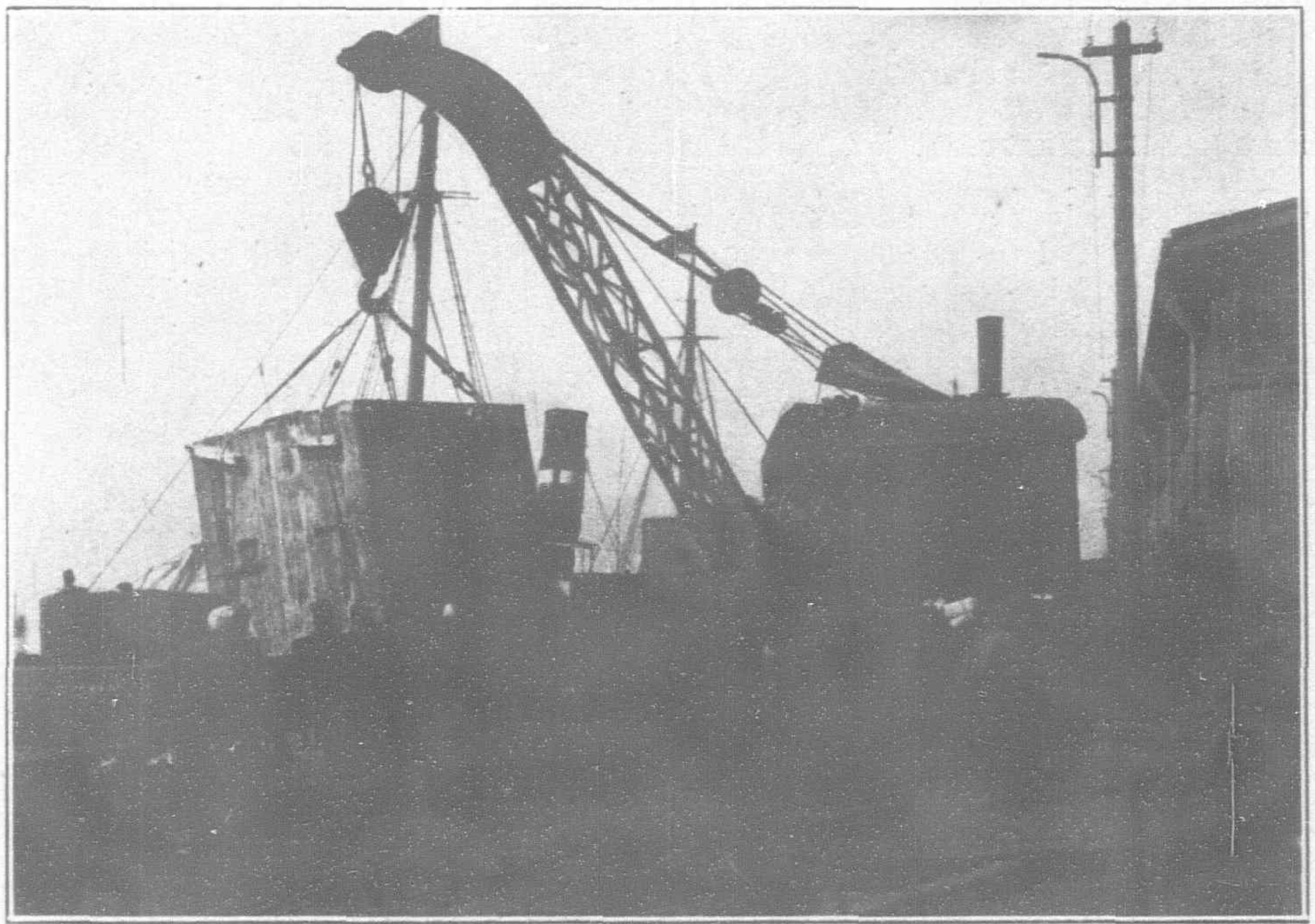
Industrially, Dairen is widely known as the center of the bean oil industry. Prior to the Russo-Japanese War, there was little activity in this line. But when the South Manchuria Railway Company came into being, it invested largely in the local industries, with a view to utilizing to the maximum the bean resources of Manchuria, which it also did all in its power to attract to Dairen. Besides, the Japanese administration of the Leased Territory of Kwantung, in which Dairen is situated, has encouraged business enterprise in every possible way. According to the figures available, the output of bean cakes in 1924 alone exceeded 27,638,187 pieces, valued at $17,680,982. The total output of bean oil for the same period was 129,962,391 catties, valued at no less than $26,238,562, being mostly consumed in the Manchurian provinces and Shantung and Chihli. The total value of the principal products of Dairen in 1924, on the basis of the Japanese official figures, was $94,078,972.

The recent wars in the Three Eastern Provinces disturbed the monetary market of Dairen to some extent, but with the rich crops in wheat and beans this year, conditions are well on the road to recovery. It has now eight principal banks: the Bank of Chosen, the Yokohama Specie Bank, the Seiryu Bank, Ltd., the Bank of Manchuria, Dairen Hsin Sin Bank, Dairen Commercial Bank, the Bank of China and the Oriental Development Co., Ltd. In addition to these banking institutions, there are three exchanges of considerable importance:

(1) Dairen Stock Exchange and Trust Co., Ltd. The company has a capital of Y.3,000,000 and a reserved of more than Y.1,500,000.

(2) Dairen Staple Produce Exchange and Trust, Ltd. This is capitalised at Y.15,000,000 and transacts business in bean oil, beancakes, *kaoliang*, etc. The total commissions amount to Y.140,000 a year. Its net profit for the quarter ended December 31, 1925, reached Y.227,633, yielding a dividend of 8 per cent.

(3) Dairen Commodity Exchange, Ltd. This has a capital of Y.10,000,000 and a reserve of Y.2,500,000. It has had a comparatively short existence, but even now it exercises much influence over the import and export business.



Steam Crane, Dairen Wharf

New Japanese Vessels

It is interesting to note that the Osaka Shosen Kaisha have recently ordered two new vessels each of 1,500 tons gross register, which are to be constructed in Japan by the Messrs. Mitsubishi Zosen Kaisha, at their Kobe dockyard, and both of these vessels are to be equipped with two sets of Vickers 600 h.p. Diesel engines.

New Service Launch for Japanese Navy

The Hampton yard of Messrs. John I. Thorneycroft and Company Ltd., have recently completed a high speed service launch of the C.M.B. type, to the order of the Japanese War Department. The craft is approximately 35 feet in length, and is fitted with a 12-cylinder 350 B.H.P. Thorneycroft petrol engine, running at 1,400 revolutions per minute.

A wireless telephony apparatus has been installed, which, it is believed, will enable the crew to be in telephonic communication with the shore or at sea up to a distance of 25 miles.

The main engine drives a dynamo at the forward end, and electric starting is fitted.

It is understood that on her trials recently carried out on the Thames, the speed attained was well in excess of 35 knots. The exact purpose for which the vessel has been constructed has not as yet been made public, but it may be mentioned that she is fitted with the necessary gear for lifting on the deck of a warship.

Five New Vessels for D.E.I. Trade

Information from Amsterdam is to the effect that the large East Indian Shipping Company—the Koninklyke Paketvaart—has recently placed an order for five new nessesl, suitable for the Company's trade, with Dutch shipbuilders.

Concrete and Ideas Retain Old Beauty of Orient and Add Strength of West

TO many people the contact of the East with the West appears in the light of a battle between efficiency and beauty. Old forms—of living, working and art—seem to be effaced by new forms, usually more conducive to ease or speed of living, but often lacking in some of the seasoned loveliness of ancient ways. Beauty—the beauty of the East—with its old leisurely, unrealistic art seems on the verge of extinction.

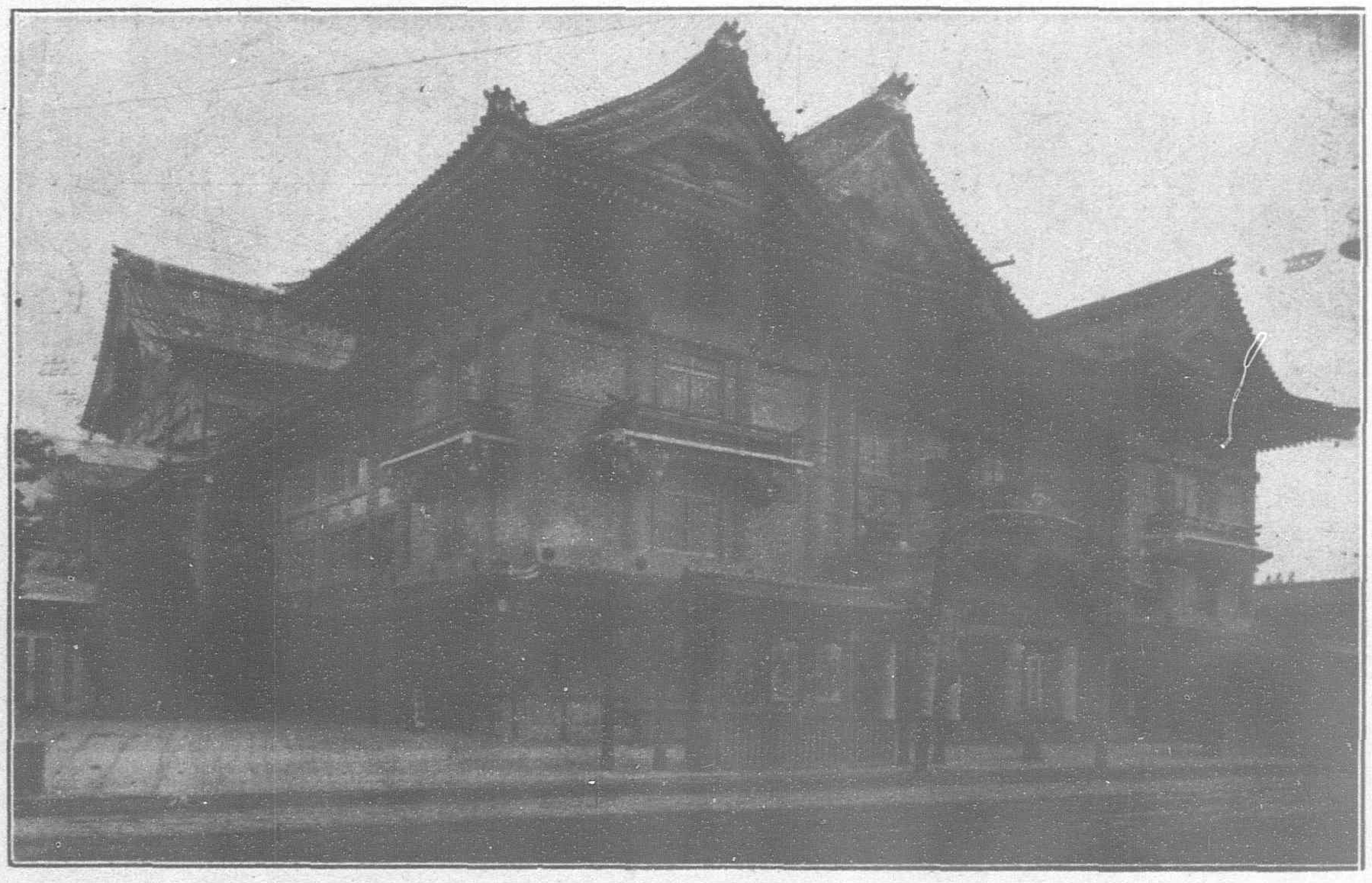
Different people view this battle of ease and art in different ways. Unworldly idealists rail and gnash their teeth, declaring that the new efficiency is the enemy of all that is worthwhile in the universe and that it should, therefore, be manfully fought and routed. But others, equally intense in their love of the old beauty but perhaps more realisticminded, do not take up such determined cudgels in behalf of vanishing loveliness. The old craftsmanship, the picturesque if hampering old manners of dress and social usages, old types of buildings, pleasing to the eye in spiet of their failure to cater to creature comforts—these they, too, love, but they do not fight so truculently in their cause. Instead they are realists, and they shrug their shoulders. The old beauty, they say, much as we may love it, is dying. We are impotent to save it. So perhaps the best we can do is turn our attention to making as beautiful as possible the heretofore somewhat unlovely implements of the new life.

Until very recently these two attitudes covered practically all the workers and spectators in the Oriental world. There was, of course, another group—but not very large—a group of people who could see no beauty worth bothering about in the things that were being lost, whose eyes were so fast fixed on the advantages of the modern world that everything else seemed unimportant.

So to many it was a dreary prospect—beauty's battle in the hands of a few helpless dreamers, while the whole face of the Oriental world was being transformed overnight.

Now, however, there has come upon the stage a new actor, the man who seeks to bring about a synthesis of the best in the old and the new, the East and the West. We find him in every walk of life. In thought, he is trying to bring about a merging of old and new ideas, to enlist some of the leisurely appreciation of cultural things, which was the fine essence of the old days, and so to temper the new attitude which sees a better world mainly in terms of a more convenient world.

This type of man appears to-day, in art, also. There he is trying to adapt the necessities of the new life to old forms.



Reminiscent of Old Japan.—The Beautiful Exterior of the Kabukiza

Of these new artists, none is more interesting than the architect in the Orient who is beginning to rebel against the ugly, square, western boxes, that are making unsightly the ancient Oriental cities. He will no longer admit that only in such ugliness can one secure proper heat, light, ventilation and sanitation. Instead, he is trying to bring these desirable comforts into buildings that are not ugly and squat and square but which have some of the beauty of the East.

One in Tokyo

One finds a number of such artists in the Orient to-day. There is one at least in Tokyo, the man who after the earthquake rebuilt the Kabukiza, the huge theatre in the heart of the city where old historic plays are given. He did not do the easy, obvious thing of building a western playhouse, with conventional Greek pillars and a flat western roof. He made the Kabukiza a thing of beauty in the style of old Japan. Beautifully curving, tilted roofs, decorated rafters jutting out from under its eaves, extended beams marking the levels of the floors, all the elements that are so intimately associated with the East. The whole line and proportion and decoration of the building are Japanese, and it is colored not grey or white or red, but a lovely, warm yellow, so that the Kabukiza stands out like a great Japanese jewel in the midst of hybrid, boxy western industrialism.

But the real marvel of the Kabukiza is not that it is built of Japanese design. There is no trick in erecting a Japanese building in Tokyo. There are still hundreds of them built every year. The marvel of this particular Japanese building is that it is structurally not Japanese at all. Although every line and curve and decoration of it is authentic in the Japanese style, it is made of *solid concrete—every bit of it, every jutting gable and tile of its roof.* The old wine of Japan, with all its old flavor, has been put into a strange new bottle.

In Tokyo, the architects tell you that the Kabukiza is a freak, all right for a theatre where expense is not so great an object and where there is no great need for light, but that for houses, western materials in Japanese designs would be too expensive, and for office buildings there would be too little light. That is the opinion of even so great an artist and so earnest a lover of Japanese forms as the man who designed the Meiji Shrine.

Different in China

In China, however, one finds a different situation. Here, too, there is a movement afoot among a small group of men to retain the beauty of old forms but to use modern methods. And in China, too, here and there, attempts have been made to build modern structures, which are not square and squat for the sake of cheapness or ornate in the way of the west, with pillars and friezes and balustrades and gimcracks. And it has been found in China that it is quite possible to build in such a way that all the beauty of old China can be retained without the slightest sacrifice of the comfort demanded by the West.

The most conclusive proof of this contention can be seen at the new campus of Yenching University, at Haitien, not far from Peking. Going along the road that leads from the capital city to the western hills, one passes the campus on the right. Its buildings are now almost completed. There are large buildings, small buildings, lovely proportioned square buildings, a tiny pavillion, a pagoda, all beautiful in the old Chinese style of curving tiled roofs with animals chasing each other over the edge at the eaves, with strong, red, supporting pillars, with ornately patterned and painted rafters, with great expanses of windows in small checkered squares. And just like the Kabukiza the Yenching buildings are convincingly Oriental,—but like the Kabukiza, not Oriental at all. Whatever in a Chinese house would be wood, here is concrete. All the many rows of rafters under the eaves, the brackets, the supporting pillars, and even the tiles are of concrete.

Result Incredible

The effect is almost incredible. In fact, when a Chinese architect was recently shown the photograph of the brackets reproduced in this article, he refused to believe they were not of wood.

All the architects in China who are interested in retaining old forms are enthusiastic about the new Yenching buildings. They declare them to be the best adaptation of western convenience to Chinese design that has as yet been achieved. There is no sudden break in the design at Haitien, where the West ends and the East begins. For one thing, the red pillars take care of that, as do also the large, spanned, checkered latticed windows, with glazed glass, successfully suggestive of white paper.

The Builders

There has been, of course, an enormous amount of time and thought given to making Yenching's Chinese dress convincing. Henry K. Murphy, the man who designed some of the buildings for Yale in China, is the original designer. To him goes much of the credit.

But not all. Mr. John MacGregor Gibb, by training a professor of Chemistry, but obviously a born builder, has been the man on the ground, the man who has worked out all the details of the actual building,solved the many problems that came along, constructed the wooden patterns of the complicated outrigger brackets, devised a hundred ways and means for making concrete take on the role of wood.

As might be expected, Mr. Gibb has had some curious experiences in the course of his work as director of the construction department of the new campus. Many of them show that the idea of building old China in new concrete has not come a day too soon. The old art of making the patterned brackets, for instance, had been almost forgotten in the generations since the coming of western ideas and the republic. Mr. Gibb had to institute a thorough search before he found two old men who remembered how the elaborate supports had been made in the days of the Empire, and who could supervise the setting up of wooden patterns.

Incidentally these old men told strange tales of the old days, tales that are indicative of a former lack of respect for the value of time which would cause a modern contractor to tear his hair. The corner brackets, in the old days, used to take one man a hundred days to make, and a bracket above a beam took seventy days. One begins to understand why there luxuries are no longer being built.

One Diversion

Other curious experiences are reported by Mr. Gibb. The tiled roofs, so typical of Chinese buildings, are curved from crest to eave, in the manner of all tiled roofs in China. But the curve at Haitien was not in the original design. Nor had Mr. Gibb ordered it ; it had been considered too costly.

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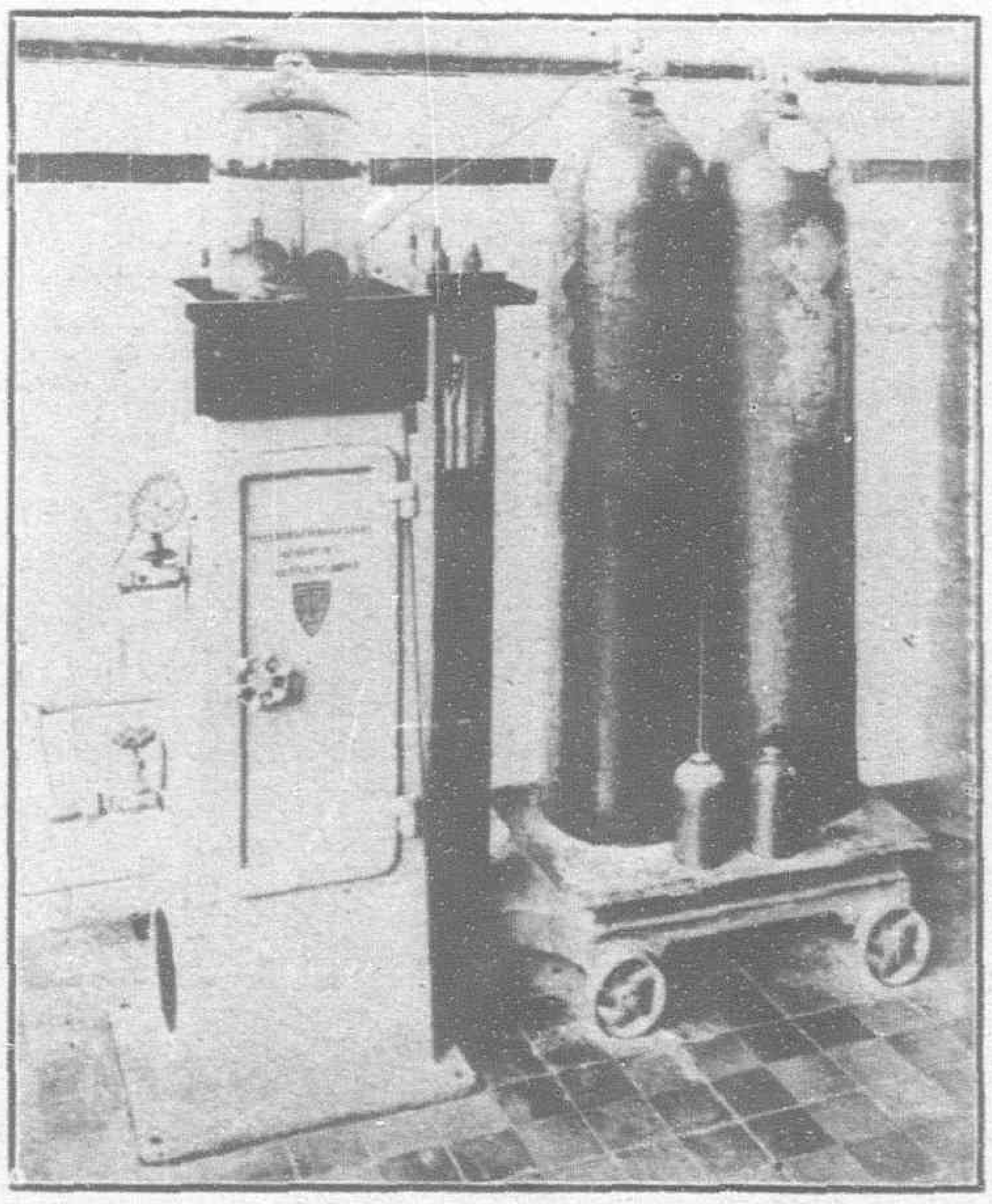

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The curve in the roofs came about in this way. When Mr. Gibb gave the order to his Number I man to go ahead with the roofs, the man looked at the design and shook his head. He did not go to work immediately. Finally he came back to Mr. Gibb and asked him incredulously if he really wanted the roofs made like that. And when Mr. Gibb queried, " Why not ? " the master-craftsman answered, " But there is no curve." And the up-shot was that the workmen put in the curves that were not in the design. As a matter of fact, the roofs cost no more.

Numerous other experiences could be recorded as other problems came up to be solved. The casting of the complicated triple brackets, so consuming of time in the old days, was not a long job at Haitien. But the method had no relation to the use of the structures asbrackets. They were made in three pieces, utterly disregarding the original shape of the wood. The arms of the brackets were cast together with the rafter they originally would have embraced. The whole triple structure was cut straight through in three pieces.

Also there were the problems of expense. The ceiling rafters, close-set in Chinese buildings to hold up the matting of the roof, were not needed structurally at Haitien, built of concrete and brick. But to have omitted them would have been unthinkable. These square and round jutting rafters, gaily protruding under the eaves, are an inseparable part of Chinese building design. So they were made, all of concrete, but they were not made entire. Only the parts that would show were cast.

One Effect Retained

All such secrets of economy are, of course, completely hidden in the finished buildings. Looking across the campus at Haitien with its buildings of grey brick and red pillars and elaborately painted eaves, it is hard to believe that the whole was not fashioned in the old way, by leisurely Chinese workmen, building by rule-of-thumb handed down through generations of builders, taking a hundred days to build a corner bracket, and fashioning curved roofs because no tiled roof could ever be made in any other way. The whole effect of this old leisureliness has been retained. It is really another instance of old wine in new bottles, at Haitien.

When it comes to the question of whether it has been worth while, there is little doubt of the answer. One compares this campus with other campuses built by westerners in China and by modern Chinese, campuses that are made ugly by unimaginative square buildings which pay respect neither to tradition nor beauty.

There will be, no doubt, protests from artist-builders here and there who insist that the first principle of building should be that each element in the structure should have its structural value, that beauty should be a matter of inspired utility. Such men will rail at the idea of rafters that do no " rafting " and brackets that are cut across where they originally were meant to be strongest. But only in this way can anything of the old beauty of design of Chinese buildings be preserved in the present age of efficiency. One wonders if honesty at the cost of beauty is worth while.

The day is gone when prospective builders are willing to allow a hundred days to a man to build a bracket, or when they will be content with wood in which birds make nests, if they can have instead the dependable, if inhospitable, permanency of concrete. And at Haitien one is given hope that with the passing of the leisureliness of the old days, it is not necessary that all the beauty of those days be lost also.

F. H. Robb Appointed Westinghouse Service Sales Manager

Mr. F. H. Robb, formerly Automotive Service Superintendent of the Westinghouse Electric and Manufacturing Company at Springfield, has just been appointed New England Service Sales Division Manager of the Company with headquarters at Boston. Mr. Robb, who is a native Pennsylvanian, has been employed by the Westinghouse Company since 1919, first as a Field Engineer in charge of the Chicago District of the Automotive Service Department and later as Automotive Service Superintendent.

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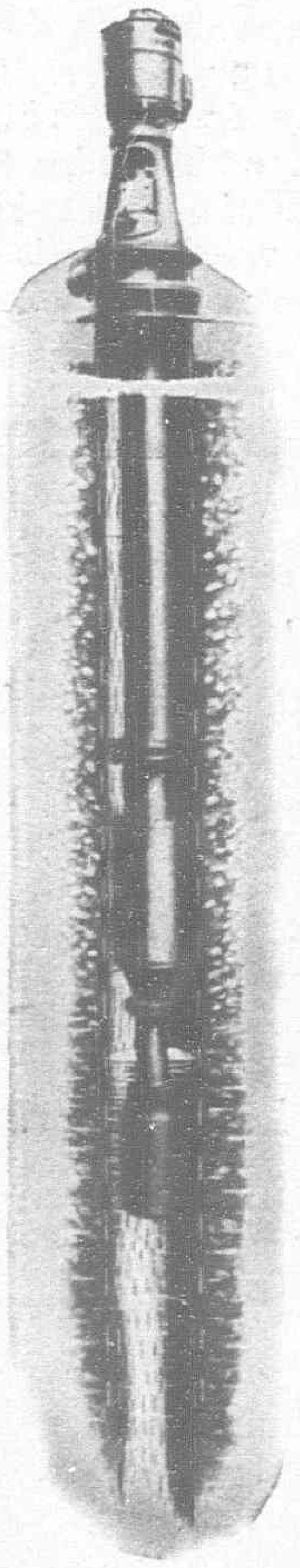

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